

Qh
556
m7x
v7, pt 79
Ent -

Part LXXIX.)

79

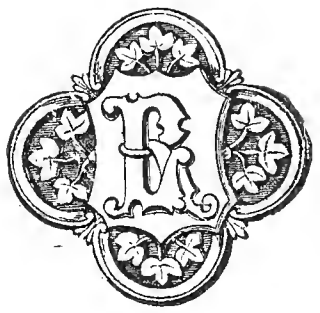
Price 10s. plain, 15s. coloured.

LEPIDOPTERA INDICA.

COL. C. SWINHOE, M.A., F.L.S., F.Z.S., F.E.S.,

MEMBER OF THE BOMBAY NATURAL HISTORY SOCIETY AND OF THE ENTOMOLOGICAL SOCIETY OF FRANCE.

Moore, Frederick



LONDON:
LOVELL REEVE & CO., LTD.,
PUBLISHERS TO THE HOME, COLONIAL AND INDIAN GOVERNMENTS,
6, HENRIETTA STREET, COVENT GARDEN.
1909.

WORKS PUBLISHED BY LOVELL REEVE & CO., Ltd.,
6, HENRIETTA STREET, COVENT GARDEN, LONDON.

The Hepaticæ of the British Isles. By W. H. PEARSON. Complete in Two Vols., with 228 Plates, £5 5s. plain, £7 10s. coloured.

The Natural History of Plants. By H. BAILLON, President of the Linnæan Society of Paris. Super-royal 8vo. Vols. I. to VIII., with 3545 Wood Engravings, 21s. each.

The Botanical Magazine; Figures and Descriptions of New and Rare Plants suitable for the Garden, Stove, or Greenhouse. Fourth Series. Edited by D. PRAIN, C.I.E., LL.D., F.R.S., Director of the Royal Gardens, Kew. Vols. I. to IV., Royal 8vo, 42s. Published Monthly, with 6 Plates, 3s. 6d., coloured. Annual Subscription, 42s.
 COMPLETION of the THIRD SERIES in 60 Vols., with nearly 4000 Coloured Plates, 42s. each; to Subscribers for the entire Series, 36s. each.

Curtis's & Hooker's Botanical Magazine; complete from the commencement in 1787 to the end of 1904, comprising the First, Second, and Third Series, 130 Vols. £136.

A New and Complete Index to the Botanical Magazine. Vols. I.—CXXX., comprising the 1st, 2nd, and 3rd Series. To which is prefixed a History of the Magazine by W. BOTTING HEMSLEY. 21s.

Catalogue of the Plants of Kumaon and of the Adjacent Portions of Garhwal and Tibet. By Lieut.-Gen. Sir RICHARD STRACHEY and J. F. DUTHIE. 5s.

Handbook of the British Flora; a Description of the Flowering Plants and Ferns indigenous to, or naturalized in, the British Isles. For the use of Beginners and Amateurs. By GEORGE BENTHAM, F.R.S. Revised by Sir J. D. HOOKER, C.B., K.C.S.I., F.R.S., &c. Crown 8vo, 9s.

Illustrations of the British Flora; a Series of Wood Engravings, with Dissections of British Plants, from Drawings by W. H. FITCH, F.L.S., and W. G. SMITH, F.L.S., forming an Illustrated Companion to BENTHAM's "Handbook," and other British Floras. 7th Edition. 1315 Wood Engravings, 9s.

Outlines of Elementary Botany, as Introductory to Local Floras. By GEORGE BENTHAM, F.R.S., F.L.S. New Edition, 1s.

Flora of Hampshire, including the Isle of Wight, with localities of the less common species. By F. TOWNSEND, M.A., F.L.S. 2nd Edition. With Coloured Map and two Plates, 21s.

Materials for a Flora of the Malayan Peninsula. By H. N. RIDLEY, M.A., F.R.S., Director of Botanic Gardens, Singapore. Complete in Three Parts, 30s.

Flora of British India. By Sir J. D. HOOKER, K.C.S.I., C.B., F.R.S., &c.; assisted by various Botanists. Complete in Seven Vols., £12. Published under the authority of the Secretary of State for India in Council.

Flora Australiensis; a Description of the Plants of the Australian Territory. By GEORGE BENTHAM, F.R.S., assisted by FERDINAND MUELLER, F.R.S., Government Botanist, Melbourne, Victoria. Complete in Seven Vols., £7 4s. Published under the auspices of the several Governments of Australia.

Handbook of the New Zealand Flora; a Systematic Description of the Native Plants of New Zealand, and the Chatham, Kermadec's, Lord Auckland's, Campbell's and Macquarrie's Islands. By Sir J. D. HOOKER, K.C.S.I., F.R.S. 42s. Published under the auspices of the Government of that Colony.

Flora of Mauritius and the Seychelles; a Description of the Flowering Plants and Ferns of those Islands. By J. G. BAKER, F.L.S. 24s. Published under the authority of the Colonial Government of Mauritius.

Flora of Tropical Africa. By DANIEL OLIVER, F.R.S., F.L.S. Vols. I. to III., 20s. each. The continuation edited by Sir W. T. THISELTON-DYER. Vol. IV., Sect. 1, 30s.; Sect. II., 27s. Vol. V., 25s. 6d. Vol. VII., 27s. 6d. Vol. VIII., 25s. 6d. Published under the authority of the Secretary of State for the Colonies.

Flora Capensis; a Systematic Description of the Plants of the Cape Colony, Caffraria, and Port Natal. By W. H. HARVEY, M.D., F.R.S., and O. W. SONDER, Ph.D. Vols. I. to III., 20s. each. Vol. VI., edited by Sir W. T. THISELTON-DYER, 24s. Vol. VII., 33s. Vol. V., Part I., 9s. Vol. IV., Sect. 2, 24s. Vol. IV., Sect. 1 (in the press).

Flora of the British West Indian Islands. By Dr. GRISEBACH, F.L.S. 42s. Published under the auspices of the Secretary of State for the Colonies.

A Second Century of Orchidaceous Plants, selected from the Subjects published in Curtis's "Botanical Magazine" since the issue of the "First Century." Edited by JAMES BATEMAN, Esq., F.R.S. Royal 4to, 100 Coloured Plates, £5 5s.

Dedicated by Special Permission to H.R.H. the Princess of Wales.

Monograph of Odontoglossum, a Genus of the Vandeous Section of Orchidaceous Plants. By JAMES BATEMAN, Esq., F.R.S. Imperial folio, with 30 Coloured Plates, £6 16s. 6d.

The Rhododendrons of Sikkim-Himalaya; being an Account, Botanical and Geographical, of the Rhododendrons recently discovered in the Mountains of Eastern Himalaya by Sir J. D. HOOKER, F.R.S. By Sir W. J. HOOKER, F.R.S. Folio, 20 Coloured Plates, £4 14s. 6d.

LOVELL REEVE & CO., LTD., 6, HENRIETTA STREET, COVENT GARDEN.

all the markings brighter and deeper in colour, the spots larger, the carmine band across the apical portion of the forewing broader, the cell spot with a crimson centre; the spots of the discal band of the hindwing well marked with crimson and the exterior margin with pale blackish spots on the vein ends.

Expanse, ♂ ♀ $1\frac{8}{10}$ inches.

Dry-season Brood (Figs. 3, ♂, 3a, ♀).

Male. Upperside white. *Forewing* more acuminate than in Wet-season form, costal line dark, apical patch bright carmine, the costal and outer black borders narrow, the inner border also much narrower, a black dot at the end of the cell. *Hindwing* with a small blackish-brown spot below the costa beyond the middle, and a narrow black somewhat macular band on the exterior margin. Underside white. *Forewing* with the apical portion tinged with pale carmine, with a whorl of brown spots with pale centres across its middle. *Hindwing* slightly tinged with pink, a pale pinkish spot at the end of the cell, and a discal band of pinkish spots.

Female. Upperside white, the basal portion irrorated with grey scales. *Forewing* with the carmine apical patch nearly as large as in the male, the outer band deeper, the inner band scarcely indicated, the patch crossed by a whorl of black spots joined together, the lowest the largest. *Hindwing* with the band on the exterior border broader than in the male, the discal band composed of small spots. Underside. *Forewing* white, suffused with pinkish-yellow scales on the basal portion, the apical portion pale carmine, the band of spots across it more pronounced than in the male, a spot at the end of the cell. *Hindwing* suffused with pinkish-yellow, the spot at the end of the cell and the discal whorl of spots larger.

Expanse, ♂ ♀ $1\frac{6}{10}$ to $1\frac{7}{10}$ inches.

Extreme Dry-season Brood (Figs. 4, ♂, 4a, ♀, 4b, ♂, 4c, ♀).

Male. Upperside white. *Forewing* with the costal margin with grey scales, the carmine apical patch large, the costal and outer margins merely a line of black, the inner margin thin and somewhat suffused; a black dot at the end of the cell in some examples. *Hindwing* with some small blackish spots at the end of the veins on the exterior margin. Underside. *Forewing* white, with the carmine apical patch showing through the wing, the whorl of brown spots across its middle small, a dot at the end of the cell. *Hindwing* generally tinted with pink, sometimes pure white, a dot at the end of the cell, and a discal whorl of small brown spots.

Female. Upperside white, suffused with grey scales on the basal portion. *Forewing* with a black dot at the end of the cell, carmine apical patch rather smaller than in the male; its outer band somewhat broader and thicker hindward, the whorl across the middle of the patch ending hindwards in a large spot, in some examples

the inner side of the patch has no black markings. *Hindwing* with a row of small discal spots and blackish spots on the exterior border on the veins. Underside. *Forewing* with a spot at the end of the cell, the crimson patch showing through the wing, with a whorl of blackish spots across its middle. *Hindwing* much as in the male, but tinged with pink.

Expanse, ♂ ♀ $1\frac{6}{10}$ inches.

HABITAT.—Ceylon and Southern India.

DISTRIBUTION.—Taken by us at Bombay, Nagar, Khandesh and Bangalore; Watson records it from Mysore, and Hampson from the Nilgiris.

CALLOSUNE DULCIS.

Plate 596, figs. 1, ♂, 1a, ♀, 1b, ♂, 1c, ♀ (Wet-season Brood = *Eboreoides*), 1d, ♂, 1e, ♀, 1f, ♂ (Intermediate Form = *Dirus*), 1g (Immaculate Form = *Immaculatus*), 1h, ♂, 1i, ♀, 1j, ♂, 1k, ♀ (Dry-season Brood = *Dulcis*).

Teracolus Dulcis, Butler, Proc. Zool. Soc. 1876, p. 157, pl. 7, fig. 13, ♂ ♀; id. 1881, p. 610. Swinhoe, Proc. Zool. Soc. 1884, p. 509.

Callosune Dulcis, Swinhoe, Journ. Bo. Nat. Hist. Soc. 1887, p. 277.

Teracolus Dirus, Butler, Proc. Zool. Soc. 1876, p. 157, pl. 7, fig. 11, ♂ ♀; id. Ann. Mag. Nat. Hist. 1880, p. 222; id. Proc. Zool. Soc. 1881, p. 610.

Teracolus Eboreoides, Butler, Proc. Zool. Soc. 1876, p. 158, pl. 7, fig. 12, ♂ ♀.

Teracolus Immaculatus, Swinhoe, Proc. Zool. Soc. 1884, p. 443; id. p. 510.

Teracolus Danaë, Watson (part), Journ. Bo. Nat. Hist. Soc. 1894, p. 521. Nurse (nec Fabricius), Journ. Bo. Nat. Hist. Soc. 1899, p. 513.

Teracolus Eupompe, Guy Marshall (part), Proc. Zool. Soc. 1897, p. 22.

Colotis Danaë, Bingham (part), Fauna of Brit. India, Butt. ii. p. 271 (1907).

Wet-season Brood (Figs. 1, ♂, 1a, ♀, 1b, ♂, 1c, ♀).

IMAGO.—A desert insect.—Male. Upperside white. *Forewing* with thick grey scales on the basal fourth, costal line black, apical carmine patch smaller than in *Danaë*, the outer and costal black margins about as broad, the inner margin much broader, narrowing hindward, to the lower angle, a black dot at the end of the cell. *Hindwing* white, the grey scales at the base less pronounced, the black band on the exterior border composed of large angulated spots on the veins, more or less touching each other. Underside white. *Forewing* with a black spot at the end of the cell, generally with a pale centre, the carmine colour faintly showing through at the apical portion, a whorl of well pronounced black almost square spots across its middle, some short blackish streaks on the outer border, two, sometimes three, large blackish spots hindwards, the lowest usually much smaller than the other two. *Hindwing* with two small black spots with crimson between them at the end of the cell, a discal whorl of duplicate blackish spots and some short blackish marginal streaks on the veins; outer marginal line on both wings black, cilia white.

Female. White, with the basal third of both wings heavily irrorated with dark grey scales, the scaling outwardly, abruptly terminating. *Forewing* with a large round black spot at the end of the cell; apical band black with four or five spear-shaped carmine streaks across its middle, its inner margin sinuous and sometimes tinged with carmine, and curves towards the outer margin at vein 2 and is continued to the lower angle; a large bifid blackish spot in the middle of the internommedian interspace and a small one in the interspace below the curve. *Hindwing* with the black outer marginal band more or less macular, but very broad, a discal whorl of blackish spots. Underside with the basal third of the forewing and the whole surface of the hindwing suffused with pinkish-yellow, the markings much as in the male, but the spot in the internommedian interspace on the forewing is present, and generally two additional large blackish spots, one in the cell and the other below it; on the hindwing the cell spot and the spots composing the discal band are well marked with carmine.

Expanse, ♂ ♀ $1\frac{9}{10}$ to 2 inches.

Intermediate Form (Figs. 1d, ♂, 1e, ♀, 1f, ♂).

Male. Upperside as in the Wet-season brood. Underside with all the markings smaller, the discal whorl of spots on the hindwing small and decreasing hindwards, generally obsolescent after vein 4.

Female. Much as in the Wet-season brood, the carmine apical streaks of the forewing larger, the other markings above and below less pronounced.

The form *Immaculatus*, fig. 1g, is merely a varietal form of *Dirus* not uncommon, in which the discal band of the hindwing below is entirely absent.

Expanse, $1\frac{9}{10}$ to 2 inches.

Dry-season Brood (Figs. 1h, ♂, 1i, ♀, 1j, ♂, 1k, ♀).

Male. Upperside white, some basal grey irrorations on the forewing, none on the hindwing. *Forewing* with the costal black line very narrow, a black dot at the end of the cell, the carmine apical patch larger than in the other forms, all the black borders being very narrow. *Hindwing* with small black spots at the ends of the veins on the exterior border. Underside white, the apical carmine patch of the forewing showing through, all the spots very small, the discal whorl of spots on the hindwing very small and incomplete.

Female. Upperside like the females of the other forms, but the basal irrorations much paler and all the spots smaller and paler, the carmine apical patch of the forewing much larger, the bands being very narrow. Underside white, basal irrorations sparse, often hardly visible, the spots small and with a pink tinge.

Expanse, ♂ ♀ $1\frac{5}{10}$ to $1\frac{7}{10}$ inches.

HABITAT.—The desert and sandy tracts of Western India.

DISTRIBUTION.—Taken by us in Karachi, Hyderabad, Sukkur, all in Sind, where it is in great numbers, also at Deesa in Rajputana, near Ahmedabad in Guzerat, and Nurse reports it from Kutch Bhooj.

CALLOSUNE SUBROSEUS.

Plate 597, figs 1, ♂, 1a, ♀, 1b, ♂, 1c, ♀ (Dry-season Brood = *Alberta*), 1d, ♂, 1e, ♀, 1f, ♂, 1g, ♀ (Wet-season Brood = *Subroseus*), 1h, ♂, 1i, ♀ (Extreme Dry-season Brood).

Teracolus Subroseus, Swinhoe, Proc. Zool. Soc. 1884, p. 443, pl. 40, figs. 6, ♂, 7, ♀; id. p. 510.

Callosune Subroseus, Swinhoe, Journ. Bo. Nat. Hist. Soc. 1887, p. 277.

Callosune Alberta, Swinhoe, Ann. Mag. Nat. Hist. 1890, p. 356.

Teracolus Danaë, Watson (part), Journ. Bo. Nat. Hist. Soc. 1894, p. 521.

Teracolus Eupompe, Guy Marshall (part), Proc. Zool. Soc. 1897, p. 22.

Colotis Danaë, Bingham (part), Fauna of Brit. India, Butt. ii. p. 271 (1907).

Dry-season Brood (Figs. 1, ♂, 1a, ♀, 1b, ♂, 1c, ♀).

IMAGO.—Male. Upperside white, with some few grey and yellow scales at the base. *Forewing* with a black dot at the end of the cell, costal line black, carmine apical patch somewhat smaller than in *Dulcis*, costal and outer black borders narrow, inner border much as in the Dry-season form of that species, not usually produced hindwards lower than vein 2. *Hindwing* with black spots at the vein ends on the exterior border. Underside. *Forewing* white, a black dot at the end of the cell, apical portion broad and of a rosy flesh colour, crossed in its middle by a whorl of pinkish-brown spots with pale centres. *Hindwing* dark rosy with a lilac tinge, a bifid red-brown spot at the end of the cell, sometimes with pink or red between them, and a discal band of red-brown spots with pale centres, decreasing in size hindwards, no other markings.

Female. Upperside like a female of the Dry-season form of *Dulcis*. Underside like the male, the lilac rosy tinge more pronounced. *Forewing* with the cell spot large, the apical band of spots with the lowest large, a dot often below it and a large almost square brown spot in the middle of the internommedian interspace. *Hindwing* as in the male. *Palpi* above, head and thorax covered with short reddish-ochreous hairs.

Expanse, ♂ ♀ $1\frac{7}{10}$ to $1\frac{8}{10}$ inches.

Wet-season Brood (Figs. 1d, ♂, 1e, ♀, 1f, ♂, 1g, ♀).

Male and Female. Very similar to the Dry-season brood, but the rosy suffusion beneath is much paler and has no lilac tinge.

Expanse, ♂ ♀ $1\frac{7}{10}$ to $1\frac{8}{10}$ inches.

Extreme Dry-season Brood (Figs. 1h, ♂, 1i, ♀).

Male and Female. Upperside like a small example of the other form, the spots on the exterior margin of the *Hindwing* quite small. Underside. Male. Both wings pure

white, the apical rosy area small and very pale, the spots minute in the *Forewing* mostly obliterated in the *Hindwing*. Female. *Forewing* white. *Hindwing* sometimes pure white, sometimes faintly tinged with rosy, all the markings pale and small.

Expanse, ♂ ♀ $1\frac{5}{10}$ to $1\frac{7}{10}$ inches.

HABITAT.—Sind.

DISTRIBUTION.—We took the Dry-season form at Karachi in October and November, and what we call the Wet-season form, for the want of a better expression, in nearly every other month of the year. We have it also from Sukkur.

Genus COLOTIS.

Colotis, Hübner, Verz. bek. Schmett. p. 97 (1816). Kirby in Allen's Nat. Hist. Lep. ii. p. 198 (1896)

Bingham (part), Fauna of Brit. India, Butt. ii. p. 259 (1907).

Mancipium, Horsfield, Cat. Lep. E.I.C. 1829, p. 141.

Idmais, Boisduval (part), Spéc. Gen. Lep. i. p. 584 (1836). Doubleday, Gen. Diurnal, Lep. p. 5 (1847).

Wings small. *Forewing* a little elongated, more or less triangular, costal margin straighter with the apex more acuminate than in *Callosune*; costal vein extending to half the margin, neuration as in *Callosune*, fore tarsi short in female; general coloration and pattern white, or salmon-pink with broad outer marginal black borders to both wings; sex marks slight, variable, sometimes not distinguishable.

Type, *C. Amata*, Fabr., from Africa.

NOTE.—*Cypræa*, *Dynamine*, *Modestus*, *Protractus* and *Phisadia* belong to the salmon-pink group, and *Vestalis* and the others to the white groups, all the species of the genus having black borders to both wings. Watson and Bingham have sunk the three first with *Calais* to the type form *Amata* from Africa, but though superficially resembling each other to some extent, the fact that *Cypræa* and *Modestus* are forest and garden insects and *Dynamine* belongs exclusively to desert tracts and sandy districts is sufficient evidence to show they cannot be one and the same species, besides which we possess seasonal forms of all three. During all the years we were collecting in Bombay and the forest and garden lands along the coast we never took a single example of *Dynamine*; nor similarly, after many months collecting in Karachi where *Dynamine* in all its seasonal forms was common, or in any part of Sind from Sukkur to the coast, did we ever capture a single example resembling either *Cypræa* or *Modestus*. *Cypræa*, *Modestus* and *Dynamine* have in the male a patch of specialized scales on the upper side of the *Hindwing*, extending from the subcostal vein to the costal margin, no glandular patch on the *Forewing*, but the lower margin is slightly convex. All the other Indian forms have a small glandular patch on the upperside of the *Forewing* above the median nervure. All the different forms of the

Cypræa group superficially much resemble each other, the Indian *Cypræa* is in resemblance nearest to the African *Amata*, the Dry-season form of the Arabian and Indian *Dynamine* (*Carnifer*) somewhat resembles the African *Calais*, but are not nearly so brightly coloured, there are distinctive differences pointed out by Boisduval (Spéc. Gen. p. 588), and considering the different quarters of the globe in which they occur we prefer to keep the Indian forms separate from the African.

COLOTIS CYPRÆA.

Plate 598, figs. 1, ♂, 1a, ♀, 1b, ♂, 1c, ♀ (Wet-season Brood), 1d, ♀ (Albino), 1e, ♂, 1f, ♀ (Dry-season Brood = *Kennedii*).

Papilio Cypræa, Fabricius, Mant. Ins. ii. p. 22 (1787).

Idmais Calais, Moore (nec Cramer), Cat. Lep. E.I.C. i. p. 67 (1857).

Teracolus Cypræa, Butler, Proc. Zool. Soc. 1876, p. 138. Swinhoe, Proc. Zool. Soc. 1885, p. 143.

Aitken, Journ. Bo. Nat. Hist. Soc. 1887, p. 39. Davidson and Aitken, id. 1890, p. 359.

Teracolus Amata, Butler (nec Fabricius), Proc. Zool. Soc. 1876, p. 138. Watson, Journ. Bo. Nat.

Hist. Soc. 1890, p. 36. Davidson, Bell and Aitken, Journ. Bo. Nat. Hist. Soc. 1897, p. 572.

Guy Marshall (part), Proc. Zool. Soc. 1897, p. 9. Sharpe (part), Monog. Genus *Teracolus*, i. p. 5, pl. 1, figs. 2, 2a, 2b (1898).

Idmais Amata, Hampson, Journ. As. Soc. Bengal, 1888, p. 362.

Teracolus Kennedii, Swinhoe, Proc. Zool. Soc. 1884, p. 440; id. 1885, p. 143.

Teracolus Calais, Aitken and Comber, Journ. Bo. Nat. Hist. Soc. 1903, p. 50.

Colotis Amata, Bingham, Fauna of Brit. India, Butt. ii. p. 261 (1907).

Wet-season Brood (Figs. 1, ♂, 1a, ♀, 1b, ♂, 1c, ♀).

IMAGO. A forest and garden insect. Male. Upperside salmon-pink. *Forewing* with a broad black costal band reaching the sub-costal vein, irrorated with salmon-pink scales on the basal portion, a black spot, often like a bar from this band, half way across the end of the cell, thick black irrorations at the base of the wing, the apical third black, its inner margin sinuous and curved, with two teeth on veins 2 and 3, continued hindwards to the lower angle, a large black spot a little inwards, touching the lower tooth, making a large bifid spot of the ground colour, a little above the lower margin, the apical portion crossed by a whorl of three or four or more spots of the ground colour and sometimes some sub-marginal short streaks near the apex, and some spots below it. *Hindwing* with black irrorations thickly down the abdominal marginal third of the wing, a broad black costal band, a narrower black band on the exterior border, often marked with pinkish close to the marginal line, some inner, somewhat spear-shaped black spots, which leave large spots of the ground colour between them and the band; cilia of both wings white. Underside pale ochreous tinged with salmon colour. *Forewing* with a pale cell spot and all the bands and spots showing through the wing, and two large prominent, nearly square black spots, on the disc, below veins

2 and 3. *Hindwing* irrorated with black and grey scales, a black dot at the end of the cell, the discal spots showing through the wing.

Female. Above and below similar to the male, but paler in colour, the costal black band of the hindwing above is absent, and all the salmon-coloured spots on both wings are larger; hindwing below with a large cell spot and a discal whorl of grey conjoined spots; there are also many Albinos (fig. 1d).

Expanse, ♂ ♀ $1\frac{8}{10}$ inches.

Dry-season Brood (Figs. 1e, ♂, 1f, ♀).

Male. Coloured above and below much as in the other form, but the black band round the wings is much narrower and the black spot above the lower margin near the angle is disconnected from the marginal band.

Female. Paler than the male, often whitish, not differing from the markings of the male except in the absence as usual of the costal band on the hindwing.

Expanse, ♂ ♀ $1\frac{7}{10}$ inches.

LARVA feeds on *Avicennia Tomontosa*, called by the natives *Sairi*; it is slender, cylindrical and rough in the upper surface like the larva of *Terias*; on examination with a strong lens, this roughness proves to be due to minute tubercles on each of which grows a short black bristle; each side above the base of the legs is fringed with somewhat longer white hairs; the colour is grass-green above, with a dark blue dorsal line very narrowly bordered with yellow; the underside is paler bottle-green, a lateral yellowish line separating the two tints.

PUPA very similar in form to that of *Terias*, and of a dingy whitey-brown colour. The aspect of this pupa confirms my general impression that this species is much nearer to *Terias* than to some of the species with which it has been lumped under the name *Teracolus* (Aitken, Journ. Bo. Nat. Hist. Soc. 1887, p. 39).

Davidson's description of larva and pupa is very similar (Journ. Bo. Nat. Hist. Soc. 1890, p. 359, and 1897, p. 572), except that he found the larva feeding on *Salvadora Persica*, and that the pupa is suspended by the tail, like the pupa of *Terias*, with a moderately long band.

HABITAT.—Southern India.

DISTRIBUTION.—We have it from Bombay, Poona, Ahmednuggar and Karwar; it is in the B. M. from Nassic, Bangalore and Kolar; Hampson records it from the Nilgiris, Watson from Mysore.

COLOTIS MODESTUS.

Plate 598, figs. 3, ♂, 3a, ♀ (Wet-season Brood), 3b, ♂ (Dry-season Brood).

Teracolus Modestus, Butler, Proc. Zool. Soc. 1876, p. 137. Watson, Journ. Bo. Nat. Hist. Soc. 1894, p. 520.

Idmais Modestus, Moore, Lep. Ceylon, i. p. 131, pl. 49, figs. 2, ♂, 2a, ♀ (1881).

Teracolus Amatus, Guy Marshall (part), Proc. Zool. Soc. 1897, p. 9. Sharpe, Monog. Gen. *Teracolus*, i. p. 5 (1898).

Colotis Amata, Bingham (part), Fauna of Brit. India, Butt. ii. p. 261 (1907).

Wet-season Brood (Figs. 3, ♂, 3a, ♀).

IMAGO. Male. Upperside paler salmon-pink than in *Cypræa*, the apex more produced. *Forewing* with the outer black band broader; the spots inside the band smaller, the inner margin of the band feebly sinuated inwardly between the veins, and barely enclosing a spot of the ground colour below vein 2, a black dentate spot at the end of the cell touching the costal band. *Hindwing* with the outer band broader and more complete than in *Cypræa* and inwardly traversed by a row of small grey bordered spots of the ground colour. Underside pale salmon-yellow, a black dot at the end of each cell, the upper markings more or less visible through the wings, and the two discal black spots on the forewing well pronounced.

Female. Upperside generally white, sometimes tinged with salmon-pink, but the coloured females are much rarer than the white ones; the black bands on both wings broader usually than in the males, the spots on the band usually larger and more numerous and complete, the black spot at the end of the cell of the forewing larger, the basal area thickly irrorated and more extensive; underside tinged with grey, more or less ochreous-tinged along the borders of the forewing and the whole of the hindwing, which has a large cell spot and a discal band of conjoined pinky-grey spots.

Expanse, ♂ ♀ $1\frac{8}{10}$ to $1\frac{9}{10}$ inches.

Dry-season Brood (Fig. 3b, ♂).

Both sexes similar to the Wet-season form, but all the bands narrower and the spots smaller.

Expanse, ♂ ♀ $1\frac{5}{10}$ to $1\frac{6}{10}$ inches.

HABITAT.—Ceylon.

DISTRIBUTION.—In our collection from Colombo and Trincomali; found by Wade and Mackwood in Dambool, Hambantotte, and Mulliatim District.

COLOTIS DYNAMINE.

Plate 598, figs. 2, ♂, 2a, ♀ (Wet-season Brood), 2b, ♀, 2c, ♀ (Dry-season Brood = *Carnifer*).

Pontia Dynamine, Klug, Symb. Phys. pl. 6, figs. 17, 18, ♂ (1829).

Idmais Dynamine, Boisduval, Spéc. Gen. Lep. i. p. 588 (1836). Swinhoe, Journ. Bo. Nat. Hist. Soc. 1887, p. 277.

Teracolus Dynamine, Butler, Proc. Zool. Soc. 1876, p. 138; id. 1881, p. 699. Swinhoe, Proc. Zool. Soc. 1884, p. 509. Aitken, Journ. Bo. Nat. Hist. Soc. 1887, p. 39.

Teracolus Carnifer, Butler, Proc. Zool. Soc. 187, p. 138, pl. 7, figs. 8, 9, ♂. Swinhoe, Proc. Zool. Soc. 1884, p. 509.

Teracolus Calais, var. *Dynamine*, Butler, Proc. Zool. Soc. 1896, p. 245.

Teracolus Calais, Sharpe (part), Monog. Gen. *Teracolus*, i. p. 1 (1898). Guy Marshall, Proc. Zool. Soc. 1897, p. 9.

Teracolus Amatus, Nurse (nec Fabricius), Journ. Bo. Nat. Hist. Soc. 1899, p. 513.

Colotis Amata, Bingham (part), Fauna of Brit. India, Butt. ii. p. 261 (1907).

Wet-season Brood (Figs. 2, ♂, 2a, ♀).

IMAGO. Inhabits desert and sandy tracts. Male. Upperside salmon-pink of a duller colour than in either of the preceding forms. *Forewing* with the base suffused with black irrorations, extending somewhat on the median and lower veins, costal band broad, entering the cell, apical portion of the outer band not so broad as in the other forms, its inner margin curved to vein 4, when it is looped twice towards the margin, the lower loop being joined to a large square black spot above the lower margin, leaving a large spot of the ground colour near the angle; the lower portion of the outer band is broad; the apical portion is crossed by a whorl of spots and some sub-marginal streaks of the ground colour. *Hindwing* with a very broad costal band, the outer band also broad, occupying often a third of the wing, the abdominal marginal third heavily irrorated with black, leaving but a small portion of the centre of the wing salmon-pink, there are usually four or five salmon-pink spots in the marginal band well separated from the margin and some salmon-pink dots close to the margin, cilia brownish with white tips. Underside much as in the other forms, but on the forewing there is a black line across the cell thickened into a spot hindward, and often on the hindwings a distinct indication of a discal whorl of spots.

Female. Upperside duller and paler in colour, sometimes whitish in the discs of both wings. *Forewing* with the basal irrorations usually more extensive, the cell spot much larger than in the male, not infrequently forming part of the costal band and running in with it to the base. *Hindwing* with the discal band of spots in the outer black band usually complete, one in each interspace; no costal band. Underside paler and brighter coloured than in the male. *Forewing* with a salmon-pink suffusion on the basal third, the bands and spots showing very distinctly through the wing. *Hindwing* irrorated with grey atoms, a small pink and red cell spot, and a well-pronounced discal whorl of conjoined pinkish-brown spots.

Expanse, ♂ ♀, $1\frac{6}{10}$ to $1\frac{7}{10}$ inches.

Dry-season Brood (Figs. 2b, ♂, 2c ♀).

Male. Upperside salmon-pink, brighter than in the Wet-season form, the basal irrorations lighter and less extensive, the exterior band of the *Hindwing* narrower, its inner portion rapidly paling into the salmon-pink colour of the wing, which consequently covers a much larger space, the spots near the margin larger and more

distinct. Underside coloured as in the other form, but the bands and spots show much more plainly through the wing.

Female. Upperside paler than in the male, sometimes nearly white. *Forewing* generally with bright salmon-pink suffusion on the basal half, the costal band irrorated with yellow scales, not extending beyond the end of the cell, except in a thin costal line, all the spots on the outer border larger and complete, there being usually one in each interspace. *Hindwing* as usual without the costal band, some salmon-pink suffusion towards the base, but less than in the *Forewing*; the exterior black band broad and usually well formed, both rows of spots in it being complete. Underside like that of the Wet-season form, but the outer marginal space in both wings is always paler, and there is usually a very bright salmon-pink suffusion on the basal half of the *Forewing*.

Expanse, ♂ ♀ $1\frac{3}{10}$ to $1\frac{5}{10}$ inches.

HABITAT.—North-Western India, Arabia.

DISTRIBUTION.—We have it from Karachi, where it is in great plenty; we took the Dry-season form in November and December, 1885, and January, 1886, and what we call the Wet-season form in most of the other months of the year; we have the Wet form taken in Hyderabad in July, 1886, from Deesa in Rajputana in July, August, September and October, in Ahmedabad in September, and we have it from Bhooj; Butler records it from Agra, Mynpuri, the Punjab and Kathiawar; we also have many examples of both forms taken by us at Aden.

COLOTIS PROTRACTUS.

Plate 599, figs. 1, ♂, 1a, ♀, 1b, ♂.

Teracolus Protractus, Butler, Proc. Zool. Soc. 1876, p. 137; id. 1881, p. 609; id. 1886, p. 372.

Swinhoe, Proc. Zool. Soc. 1884, p. 508. Aitken, Journ. Bo. Nat. Hist. Soc. 1887, p. 40.

Butler, Ann. Mag. Nat. Hist. 1888, p. 200; id. 1897, p. 388. Watson, Journ. Bo. Nat. Hist.

Soc. 1894, p. 520. Guy Marshall, Proc. Zool. Soc. 1897, p. 10. Sharpe, Monog. Gen. *Teracolus*,

i. p. 9, pl. 2, figs. 1, 1a to 1c (1898). Nurse, Journ. Bo. Nat. Hist. Soc. 1899, p. 513.

Idmais Protractus, Swinhoe, Journ. Bo. Nat. Hist. Soc. 1887, p. 276.

Colotis Protractus, Bingham, Fauna of Brit. India, Butt. ii. p. 263 (1907).

Wet-season Brood (Figs. 1 ♂, 1a ♀, 1b ♀).

IMAGO.—Inhabits desert and sandy tracts. Male. Upperside bright salmon-pink, much darker and brighter than in any of the preceding species, and more uniform. *Forewing* with very broad deep black borders, leaving but a little more than the disc down to the lower margin salmon-pink, the basal fourth being densely irrorated with black and blue-grey scales; the costal band comes down to the sub-costal vein, it fills nearly the upper half of the cell, and is joined to the large black spot at the end of the cell, which usually closes it; the apical portion of the outer band is

narrower than the rest, widening gradually hindwards down to the lower margin, and its inner margin is sinuate; across the middle of the apical portion are four or five blue-grey spots, the upper ones the largest. *Hindwing* with the outer band occupying nearly half the wing, the costal space pale greyish, the abdominal marginal space very broadly and densely irrorated with black and blue-grey scales, reducing the salmon-pink central space very much; cilia of both wings white. Underside. *Forewing* pale salmon-pink with four large black spots, one at the end of the cell, and three in a row on the lower disc near the outer margin; the first round and small in the interspace below vein 4; the second in the next interspace a little nearer the margin, larger and square; the third (the largest) in the next interspace, a little inwards, expanding hindwards on to the lower margin. *Hindwing* yellowish with some slight pinkish suffusion inwards, and greenish suffusion outwards, and covered with minute black atoms, no other markings.

Female, like the male, both above and below, but on the upperside the costal band of the forewing and the basal irrorations on both wings are lighter and more irrorated with blue-grey scales; the ground colour is also generally paler, though in some examples it is as dark and bright as in the male; on the underside the inner portion of the *Forewing* is more brightly suffused with salmon-pink, the cell spot and the lowest discal spot larger, and the *Hindwing* is usually uniform pale ochreous-pink; cilia of both sexes pale salmon-pink.

Expanse, ♂ ♀, $1\frac{7}{10}$ to $1\frac{8}{10}$ inches.

Dry-season Brood.

Male and female much lighter in colour, the borders blackish-brown, instead of deep black, and the sub-apical spots on the forewing whiter, the basal portion of the wings greyer, as is also the costal band of the forewing. Underside suffused with pale pinkish, yellowish towards the base of the forewing, the black spots smaller. *Antennæ* brownish-black, ringed with white, head, thorax and abdomen black; on the underside the palpi, thorax and abdomen are yellow.

Expanse, ♂ ♀ $1\frac{6}{10}$ to $1\frac{7}{10}$ inches.

HABITAT.—North-West India.

DISTRIBUTION.—We have it from Karachi, Hyderabad, and the Hubb River (Sind), also from Bhooj, Deesa in Rajputana, and the Western Jumna Canal, also from Campbellpur, Punjab (Yerbury); it is in the B. M. from Kutch; the type came from the Punjab, Davidson reports it from Kathiawar.

COLOTIS PHISADIA.

Plate 599, figs. 2, ♂, 2a, ♀, 2b, ♀, 2c, ♀ (Albino).

Pieris Phisadia, Godart, Enc. Méth. ix. p. 132 (1819).

Idmais Phisadia, Boisduval, Spéc. Gen. Lep. i. p. 587 (1836). Doubleday, Gen. D. Lep. p. 59 (1847).

- Teracolus Phisadia*, Butler, Proc. Zool. Soc. 1876, p. 136. Swinhoe, Proc. Zool. Soc. 1884, p. 439. Watson, Journ. Bo. Nat. Hist. Soc. 1894, p. 520. Butler, l.c. 1896, p. 245, pl. 10, fig. 13 (Pupa). Guy Marshall, Proc. Zool. Soc. 1897, p. 10. Butler, Ann. Mag. Nat. Hist. 1897, p. 389. Sharpe, Monog. Gen. Teracolus, i. p. 12, pl. 3, figs. 1a to 1g (1889).
Colotis Phisadia, Bingham, Fauna of Brit. India, Butt. ii. p. 264 (1907).
Pontia Arne, Klug, Symb. Phys. pl. 7, figs. 1 to 4, ♂ ♀ (1829).
Idmais Arne, Boisduval, Spéc. Gen. D. Lep. p. 587, pl. 19, fig. 2 (1836).
Teracolus Arne, Butler, Ann. Mag. Nat. Hist. 1876, p. 487. Manders, Ent. Monthly Mag. 1890, p. 16. Sharpe, Proc. Zool. Soc. 1896, p. 527.
Idmais Philamene, Mabille, Comptes Rend. Soc. Ent. Belg. 1880, p. cvi.

IMAGO.—Male. Upperside. *Forewing* salmon-pink, paler than in *Protractus*, basal area with black and blue-grey scales, costal band imperfect, narrow and with black and blue-grey scales, the salmon-pink portion consequently much more extensive, a large black, usually round spot at the end of the cell with a black streak running inwards from it, outer band much as in *Protractus*, but with a deeper curve on its upper margin below the apex and another below the middle. The spots larger, and of the ground colour of the wing, the lower one large and square. *Hindwing* as in *Protractus*, but the ground colour is pure white, with a few blue-grey scales at the base. Underside, both wings as in *Protractus*.

Female. Upperside. *Forewing* paler than in the male, the costal band broader, more perfect and blackish-brown, the outer band much as in the male, but browner and with some pale pinkish spots on the exterior margin. *Hindwing* as in the male, but the exterior band is more brown, and paler, and there are some pale pinkish spots on the exterior margin. Underside. Both wings pale yellowish, tinged with pink, darkest on the costa of the forewing and the outer borders of both wings, the spots on the forewing larger, the cell spot usually white-centred; a small spot white-centred at the end of the cell in the hindwing, and indications of a discal whorl of conjoined brown spots. The general colour in this sex is sometimes yellowish above, with the base of the forewing suffused with salmon-pink, sometimes without this suffusion, and sometimes both wings are white.

Expanse, ♂ ♀ 2 inches.

LARVA found feeding on *Salvadora Persica* at Aden; pea-green when young, two black spots on back of head, a white mark almost the shape of an ace of diamonds, but rather large on the second segment, when older the black spots on head disappear, and the white mark gets clearer and is outlined with black; there are two similar marks just beyond the centre of the back, the front being the smaller, and another similar mark on the eleventh segment. (Nurse, Butler's Memoir, Proc. Zool. Soc. 1896, p. 245.)

PUPA.—Pinkish-grey with the segments well marked, rests on its tail and is tied to the wood by a silk thread; well figured by Butler, Proc. Zool. Soc. 1896, plate 10, fig. 13.

HABITAT.—North-West India, Arabia and the opposite African Coast.

DISTRIBUTION.—A male of this form is in the Calcutta Museum labelled Surat. Madders is said to have obtained a single specimen at Multan in the Punjab and “one individual captured in a field near Lucknow” (Moore’s notes). We admit this species into the Indian Fauna with great hesitation; there are so many Albinos and partial Albinos in both sexes of the Teracoli, a semi-Albino form of *Protractus* might so easily be mistaken for *Phisadia*. We have not been able to examine any one of the above-mentioned specimens.

COLOTIS PUELLARIS.

Plate 599, figs. 3, ♂, 3a, ♀, 3b, ♂, 3c, ♀ (Wet-season Brood), 3d, ♂, 3e, ♀, 3f, ♂, 3g, ♀ (Dry-season Brood = *Ochreipennis* = *Rorus*).

Teracolus Puellaris, Butler, Proc. Zool. Soc. 1876, p. 136; id. 1881, p. 608; id. 1883, p. 152; id. Ann. Mag. Nat. Hist. 1880, p. 222; id. 1888, p. 200; id. 1897, p. 389. Swinhoe, Proc. Zool. Soc. 1884, pp. 438 and 509. Watson, Journ. Bo. Nat. Hist. Soc. 1894, p. 521. Guy Marshall, Proc. Zool. Soc. 1897, p. 10. Sharpe, Monog. Gen. Teracolus, i. p. 16, pl. 5, figs. 1, 1a to 1d (1898). Nurse, Journ. Bo. Nat. Hist. Soc. 1899, p. 513. Aitken and Comber, Journ. Bo. Nat. Hist. Soc. 1903, p. 51.

Idmais Puellaris, Swinhoe, Journ. Bo. Nat. Hist. Soc. 1887, p. 276.

Teracolus Ochreipennis, Butler, Proc. Zool. Soc. 1876, p. 136; id. 1881, p. 609; id. 1883, p. 152. Swinhoe, Proc. Zool. Soc. 1884, p. 509; id. Journ. Bo. Nat. Hist. Soc. 1887, p. 276.

Teracolus Rorus, Swinhoe, Proc. Zool. Soc. 1884, p. 438, pl. 39, fig. 8, ♂.

Colotis Vestalis, Bingham (part), Fauna of Brit. India, Butt. ii. p. 265 (1907).

Wet-season Brood (Figs. 3, ♂, 3a, ♀, 3b, ♂, 3c, ♀).

IMAGO. Inhabits desert and sandy tracts. Male. Upperside pure white. *Forewing* with the base irrorated with black and blue-grey scales, the cell blackly irrorated except for a small portion at its lower end, a large, generally round, black spot at the end, with a black inward streak, costal line between this and the outer band black with some blue-grey irrorations attached, outer black band much as in *Phisadia*, but narrower hindwards, the spots in it similarly placed, but pure white. *Hindwing* with very little grey irrorations at the base, the outer band as broad as in *Phisadia*, but its inner margin is more irregular; cilia of both wings white. Underside pale yellow, the outer marginal space of the forewing and the whole of the hindwing deeper yellow, the spots on the forewing as in *Phisadia*, as are also the unmarked hindwings.

Female. Upperside white, often slightly tinted with yellow. *Forewing* with the cell black, joined to, and often obscuring the large spot at its end, costal line pale, with some ochreous-grey irrorations, the base of the wing irrorated with black and blue-grey scales, the outer band as in the male, but always more or less paler. *Hindwing* with very little basal irrorations, the outer band variable in width, and paler than in the male. Underside. *Forewing* white, tinted with pale yellow, the spots as in the

male, but the lowest discal spot, though larger than the others, does not expand hindwards on to the lower margin as it always does in the male. *Hindwing* tinted with ochreous-pink, usually without markings, sometimes with indications of the discal whorl of spots. Cilia of both sexes white.

Antennæ, head, thorax and abdomen black, the antennæ speckled and tipped with white, the thorax clothed with long, bluish-grey hairs; on the underside the palpi, thorax and abdomen are white.

Expanse, ♂ ♀ $1\frac{6}{10}$ to $1\frac{7}{10}$ inches.

Dry-season Brood (Figs. 3d, ♂, 3e, ♀, 3f, ♂, 3g, ♀).

Male and Female. Upperside much as in the other form. The basal irrorations paler and the bands somewhat narrower. Underside with the forewings similar, but the spots are sensibly smaller, and the hindwings of both sexes are strongly tinted with ochreous-pink.

Expanse, ♂ ♀ $1\frac{5}{10}$ to $1\frac{6}{10}$ inches.

HABITAT.—North-West and Central India.

DISTRIBUTION.—We have it from the Hubb River, Sukkur, Larkana, Hyderabad and Karachi (Sind), also from Deesa in Rajputana; Bisnagar, Khandesh and Bhooj. Yerbury took it at Campbellpur and Chittar Pahar in the Punjab, and it is in the B. M. from Wurzeerabad.

COLOTIS VESTALIS.

Plate 600, figs. 1, ♂, 1a, ♀, 1b, ♂, 1c, ♀ (Wet-season Brood = *Dubius*), 1d, ♂, 1e, ♀ (Dry-season Brood).

Teracolus Vestalis, Butler, Proc. Zool. Soc. 1876, p. 135, pl. 7, fig. 10, ♂; id. 1881, p. 608; id. 1883, p. 152. Swinhoe, Proc. Zool. Soc. 1884, pp. 438 and 509. Watson (part), Journ. Bo. Nat. Hist. Soc. 1894, p. 520. Butler, Trans. Ent. Soc. 1895, p. 519; id. Ann. Mag. Nat. Hist. 1897, p. 390. Guy Marshall, Proc. Zool. Soc. 1897, p. 11. Sharpe, Monog. Gen. *Teracolus*, i. p. 18, pl. 6, figs. 1, 1a, 1b, 1c, and 1f (1898). Nurse, Journ. Bo. Nat. Hist. Soc. 1899, p. 513.

Idmais Vestalis, Swinhoe, Journ. Bo. Nat. Hist. Soc. 1887, p. 276.

Teracolus Peelus, Swinhoe, Proc. Zool. Soc. 1884, p. 439, pl. 39, fig. 9, ♂, and p. 509.

Teracolus Dubius, Swinhoe, l.c. pp. 439 and 509.

Colotis Vestalis, Bingham (part), Fauna of Brit. India, Butt. ii. p. 265 (1907).

Wet-season Brood (Figs. 1, ♂, 1a, ♀, 1b, ♂, 1c, ♀).

IMAGO.—Inhabits desert and sandy tracts. Male. Upperside pure white, wings somewhat more elongate than in *Puellaris*. *Forewing* usually with less basal irroration, the bands and spots similar. *Hindwing* with the marginal band a little narrower. Underside as in the male of *Puellaris*, but the lowest discal spot of the forewing is usually smaller than the one above it, and is always well separated from the lower margin, whereas in *Puellaris*, as in *Protractus* and *Phisadia*, it is the largest and always expands hindwards on to the lower margin.

Female. Upperside white and marked like the male, but the bands are of a paler tint and the basal irrorations are much more extensive. Underside. *Forewing* white tinted with yellow, the spots as in the male, the lowest discal spot almost always the smallest of the three, often minute and obscure, the borders tinted with pale flesh colour. *Hindwing* darker than the forewing, tinted with pale flesh colour, and with a discal whorl of brown conjoined spots, more or less complete.

Expanse, ♂ ♀ $1\frac{8}{10}$ to $1\frac{9}{10}$ inches.

Dry-season Brood (Figs. 1d, ♂, 1e, ♀).

Male. Upperside white, the general markings as in the Wet-season form, but the bands on both wings are reduced to almost half the width, the basal irrorations are much less, the white spots in the outer band of the forewing are larger, and the costal space up to the end of the cell is whitish irrorated with ochreous scales, and from thence to the apical band is pure white, the outer band of the hindwing never reaches the anal angle. Underside as in the Wet-season form, but the spots small.

Female. Like the Wet-season form, but the bands on the upperside usually very pale and narrow, the spots obscure; similar also on the underside, the spots small, the lowest discal spot minute, the discal band of the hindwing obsolescent.

Expanse, ♂ ♀ $1\frac{7}{10}$ to $1\frac{8}{10}$ inches.

In both forms there are occasional females, varying in colour from sulphur-yellow to pale yellow = *Peelus*.

HABITAT.—North-West India.

DISTRIBUTION.—In our collection from Karachi, Hyderabad, the Hubb River (Sind), Deesa (Rajputana). Nurse records it from Kutch, and Yerbury took it at Campbellpur (Punjab).

COLOTIS INTERMISSUS.

Plate 600, figs. 2, ♂, 2a, ♀, 2b, ♂, 2c, ♀ (Wet-season Brood), 2d, ♂, 2e, ♀, 2f, ♂, 2g, ♀ (Dry-season Brood).

Teracolus Intermissus, Butler, Proc. Zool. Soc. 1883, p. 152.

Teracolus Ochreipennis, Swinhoe (nec Butler), Proc. Zool. Soc. 1884, p. 438.

Teracolus Vestalis, Watson (part), Journ. Bo. Nat. Hist. Soc. 1894, p. 520. Sharpe, Monog. Gen.

Teracolus, i. p. 18, pl. 6, figs. 1d, 1e (1898).

Colotis Vestalis, Bingham (part), Fauna of Brit. India, Butt. ii. p. 265 (1907).

Wet-season Brood (Figs. 2, ♂, 2a, ♀, 2b, ♂, 2c, ♀).

IMAGO.—Inhabits desert and sandy districts. Male. Upperside white, the bands and markings as in the Dry-season form of *Vestalis*. Underside. *Forewing* tinted with yellow, the outer borders tinted with pinkish flesh colour. *Hindwing* in freshly emerged specimens dark pinkish flesh colour, the black band showing slightly through the wing, the entire wing covered with minute black atoms.

Female. Upperside as in the females of the Dry-season form of *Vestalis*. Underside similar as to markings, but the borders of the forewing and the whole of the hindwing suffused with dark pinkish flesh colour, with minute irrorations as in the male, the flesh colour of the undersurface in both sexes fades in life, but not after death, and never becomes yellow as in *Vestalis* if the examples are kept from the light; a discal whorl of conjoined brown spots.

Expanse, ♂ ♀ $1\frac{5}{10}$ inches.

Dry-season Brood (Figs. 2d, ♂, 2e, ♀, 2f, ♂, 2g, ♀).

Male. Upperside white, with all the bands very narrow, the white costal space on the forewing between the cell spot and the apical band much wider than in the Wet-season form, the white spots in the outer band larger, the marginal band of the hindwing sometimes very narrow and seldom extending hindwards beyond the extremity of vein 2. Underside as in the Wet-season form.

Female. Upperside white, often tinted with pale yellow, the bands as narrow as in the male, but much paler in colour, the basal half of the costa of forewing irrorated with ochreous scales. Underside like that of the Wet-season form, but the spots of the forewing are smaller, the lowest discal spot minute, and the hindwing has no markings.

Expanse, ♂ ♀ $1\frac{4}{10}$ inches.

HABITAT.—Karachi (Sind).

DISTRIBUTION.—We took this form at Karachi in November, December, January, February, and March, 1885–86. The type came from Karachi. We have never obtained it in any other locality. There can be no doubt there are two forms of it, whether we call them Wet and Dry-season forms or by any other term; we have a long series, and cannot but come to the conclusion that it should be kept distinct until we get some good evidence to the contrary.

Genus MADAI, nov.

Idmais, Boisduval (part), Spéc. Gen. Lep. i. p. 584 (1836). Doubleday, Gen. Diurn. Lep. p. 59 (1847).

Schatz, Ex. Schmett. ii. p. 73 (1886). Kirby, in Allen's Nat. Hist. Lep. ii. p. 198 (1886).

Insects of a uniform salmon-buff colour, with a black outer marginal band, occupying the apical third of *Forewings* and always extending to the lower angle, containing spots of the ground colour; the band on the hindwings macular; males and females very similar, but many females liable to albinism; larger than *Colotis*, the costa of forewings concave, the apex sub-acuminate; males always with a prominent sex mark on the forewings, in the form of a patch of brown specialized scales or androconia on the underside above vein 1, closer to the base than to the exterior margin, prominent above as a raised spot, the hinder margin of forewing prominently lobed; all the species are desert forms.

Type, *M. Fausta*, Olive, from Arabia and India.

MADAIS FAUSTA.

Plate 601, figs. 1, ♂, 1a, ♀, 1b, ♂ (Wet-season Brood), 1c, ♂, 1d, ♀ (Dry-season Brood), 1e, ♀ (Albino).

Papilio Fausta, Olivier, Voy. l'Emp. Oth. Atlas, pl. 33, figs. 4a, 4b, ♀ (1801).

Pieris Fausta, Godart, Enc. Méth. ix. p. 132 (1819).

Idmais Fausta, Boisduval, Spéc. Gen. Lep. i. p. 586 (1836). Boisduval, Gen. D. Lep. p. 59 (1847).

Moore, Cat. Lep. Mus. E.I.C. i. p. 68 (1857). Swinhoe, Journ. Bo. Nat. Hist. Soc. 1887, p. 40.

Teracolus Fausta, Butler, Proc. Zool. Soc. 1876, p. 134; id. Ann. Mag. Nat. Hist. 1882, p. 4.

Swinhoe, Proc. Zool. Soc. 1884, p. 436. Aitken, Journ. Bo. Nat. Hist. Soc. 1887, p. 40.

Watson (part), Journ. Bo. Nat. Hist. Soc. 1894, p. 517. Guy Marshall (part), Proc. Zool. Soc.

1897, p. 8. Butler, Ann. Mag. Nat. Hist. 1897, p. 498. Nurse, Journ. Bo. Nat. Hist. Soc.

1899, p. 513.

Colotis Fausta, Bingham (part), Fauna of Brit. India, Butt. ii. p. 266 (1907).

Idmais Faustina, Felder, Reise Novara, Lep. ii. p. 190 (1865).

Teracolus Faustina, Butler, Proc. Zool. Soc. 1876, p. 134.

Teracolus Rosaceus, Butler, l.c. p. 134, pl. 7, fig. 6, ♂.

Teracolus Oriens, Butler, l.c. fig. 7, ♀.

Teracolus Solaris, Butler, l.c. p. 135. Swinhoe, Proc. Zool. Soc. 1884, p. 437, pl. 39, fig. 5, ♀.

Wet-season Brood (Figs. 1, ♂, 1a, ♀, 1b, ♂).

IMAGO.—Male. Upperside of a uniform ochreous-salmon colour. *Forewing* with the costal band blackish, caused by dense black irrorations, a black oval spot at the end of the cell, a black outer band, formed by a bar that extends downwards from the costa at one-fifth from apex to vein 4, the black extended on the veins to the outer marginal band, leaving four spots of the ground colour, the upper one small, the marginal band is continued narrowly to the lower angle of the wing, and in some examples is joined to the bar from the costa, below the spots, but this extension is often very irregular and dislocated; this outer band is rather uniform in width, narrowing hindwards very gradually, and contains a row of marginal small spots of the ground colour, one in each interspace. *Hindwing* with a marginal row of black nearly square spots, one at the extremity of each vein, the costal space whitish. Underside pale ochreous tinged with a rosy flush, darkest towards the base; bands and spots pale orange-brown, a white-centred spot at the end of each cell, the sub-apical bar of the forewing followed by two or three spots in the disc and a complete discal band of conjoined spots.

Female. Upperside marked like the male, but paler, and there are many Albinos; the basal irrorations are more extensive, sometimes covering nearly half the wings, the cell spot of the forewing is larger, and also the spots on the hindwing, their inner margins touching each other, and there are indications of a discal blackish macular band. Underside paler, the black cell spot of forewing white-centred, the discal bands variable in size, in some of the white examples the spots are conjoined and very

prominent. Antennæ, head, thorax, and abdomen blackish, the two former with salmon-buff hairs, abdomen with similar coloured scaling, club of antennæ also salmon-buff on the underside.

Expanse, ♂ ♀ 2 inches.

Dry-season Brood (Figs. 1c, ♂, 1d, ♀).

Male. Upperside paler than in the Wet-season form. *Forewing* with the apical band small, the sub-apical bar and exterior marginal band being well separated and only joined together by some black lines on the veins, the thin marginal band has large spots of the ground colour in it, is much attenuated hindwards and seldom reaches the lower angle. *Hindwing* with the marginal spots small. Underside pale, the markings similar, but feeble.

Female. Similar to the male, rather paler in colour, the apical band more extensive, the sub-apical bar continued hindwards to vein 2, connected with the marginal band by black veins forming five or six spots of the ground colour, and a marginal row of well pronounced similarly coloured spots. Underside as in the male, the spots on the bands across the disc of both wings conjoined, those in the forewing sometimes marked with black.

Expanse, ♂ ♀ $1\frac{8}{10}$ to $1\frac{9}{10}$ inches.

HABITAT.—North-West India, Asia Minor, Persia and Afghanistan.

DISTRIBUTION.—We took it at Karachi, Hyderabad (Sind), Quetta, Kandahar, Ahmedabad, Deesa, and Bisnuggar (Goozerat), and we have it from Fao in the Persian Gulf, Bushire and Bhooj. It is in the B. M. from Turkey, Syria, Lebanon, Rawul Pindi, Campbellpur, Chittar, Pakar and Kutch, and Butler reports it from Kattiawar and the Berars.

MADAIS FULVIA.

Plate 601, figs. 2, ♂, 2a, ♀, 2b, ♂ (Wet-season Brood), 2c, ♂, 2d, ♀, 2e, ♂ (Dry-season Brood = *Palliseri*).

Idmais Fulvia, Wallace, Trans. Ent. Soc. 1867, p. 392, pl. 9, fig. 5, ♂ ♀.

Teracolus Fulvia, Butler, Proc. Zool. Soc. 1876, p. 135. Swinhoe, Proc. Zool. Soc. 1885, p. 143.

Idmais Tripuncta, Butler, Proc. Zool. Soc. 1868, p. 221, pl. 17, fig. 9, ♂. Moore, Lep. Ceylon, i. p. 130, pl. 49, figs. 3, 3a, ♂ ♀. Butler, Ann. Mag. Nat. Hist. 1897, p. 500.

Colotis Tripuncta, Bingham, Fauna of Brit. India, Butt. ii. p. 267 (1907).

Teracolus Tripunctatus, Butler, Proc. Zool. Soc. 1880, p. 149, pl. 15, fig. 4, ♀. Watson, Journ. Bo. Nat. Hist. Soc. 1894, p. 518.

Idmais Surya, Moore, Journ. As. Soc. Bengal, 1884, p. 45.

Teracolus Palliseri, Butler, Ann. Mag. Nat. Hist. 1888, p. 418.

Wet-season Brood (Figs. 2, ♂, 2a, ♀, 2b, ♂).

IMAGO.—Male. Upperside ochreous-salmon colour, darker than in *Fausta*. *Forewing* with an iron-grey costal band of scales, a large black nearly oval spot at the

end of the cell, a rather broad apical black band gradually narrowing hindward to the lower angle, with three large spots of the ground colour in it in a row, sometimes there is a minute spot above and another below this row, and some pale dots on the margin, some grey scales at the base. *Hindwing* with a band of largish square spots on the exterior margin, at the ends of the veins. Underside pale ochreous, the forewing tinged with salmon colour, a large black oval white-centred spot at the end of the cell of the forewing, a red-brown, white-centred cell spot on hindwing, and a discal band of red-brown spots across both wings.

Female above and below marked like the male, the spots a little larger, the ground colour nearly always white, every example in the B. M. collection is pure white, and in most examples there are indications of a discal band of black spots on the hindwings above; on the underside the edges of the wings are tinged with pink, the spots large and dark, nearly black on the forewing.

Expanse, ♂ ♀ 2 inches.

Dry-season Brood (Figs. 2c, ♂, 2d, ♀, 2e, ♂).

Male. Upperside paler than in the other form. *Forewing*, with the irrorations of the costa and at the base very feeble, the cell spot smaller, the apical band paler in colour and not continued to the lower angle. *Hindwing* with the exterior band hardly indicated, there being merely three or four faint marks on it. Underside very pale, the markings the same, but very feeble and of a pinkish-ochreous colour.

Female. Often white like the Wet-season form, sometimes tinged with salmon colour, always paler than the male. Upperside, the markings darker than in the male, the hindwing generally with well-marked black marginal spots. Underside, the markings are similarly placed, but the discal bands are broad, well pronounced and of a pinkish-brown colour.

Expanse, ♂ ♀ $1\frac{8}{10}$ to $1\frac{9}{10}$ inches.

HABITAT.—Ceylon, Southern India.

DISTRIBUTION.—We took it on the small hills above Poona, and at Purundhur Mountain near Poona, we have it also from Madras and the Nilgiris, it is in the B. M. from Ceylon, Ganjam and Khandesh. Moore records it from Orissa.

ALLIED ARABIAN SPECIES.

Teracolus Protomedia, Pontia Protomedia, Klug, Symb. Phys. Ins. pl. 8, figs. 13, 14 (1829).

Teracolus Arenicolens, Butler, Ent. Mo. Mag. 1884, p. 81.

Teracolus Pleione, Pontia Pleione, Klug, l.c. figs. 7, 8 (1829), *Teracolus Pleione*, Swinhoe, Proc. Zool. Soc. 1884, p. 436. Guy Marshall, Proc. Zool. Soc. 1897, p. 14. *Synonym*, Idmais Miriam, Felder, Reise Nov. p. 190, pl. 27, figs. 3 and 4 (1865). *Teracolus Chrysomela*, Butler, Cist. Ent. 1874, p. 244. Idmais Echeria, Mabille; Bull. Soc. Ent. France, 1879, p. 174.

- Teracolus Eris*, *Pontia Eris*, Klug, l.c. pl. 6, figs. 15, 16 (1829). *Synonym*, *Idmais Fatma*, Felder, Reise Nov. p. 189, pl. 25, fig. 3 (1865).
- Teracolus Halimede*, *Pontia Halimede*, Klug, l.c. pl. 7, figs. 12 to 15 (1829). Guy Marshall, Proc. Zool. Soc. 1897, p. 15. *Synonym*, *Pontia Acaste*, Klug, l.c. figs. 16, 17, ♀ (1829). *Pieris Polycaste*, Boisduval, Spéc. Gen. Lep. i. p. 525 (1836). *Teracolus Cœlestis*, Swinhoe, Proc. Zool. Soc. 1884, p. 435, pl. 39, figs. 1, 2.
- Callosune Yerburi*, *Teracolus Yerburi*, Swinhoe, Proc. Zool. Soc. 1884, p. 441, pl. 39, fig. 12. Guy Marshall, Proc. Zool. Soc. 1897, p. 33. *Synonym*, *Teracolus Swinhoei*, Butler, Proc. Zool. Soc. 1884, p. 491.
- Callosune Nouna*, *Anthocharis Nouna*, Lucas, Expl. Alg. Zool. iii. p. 350, pl. 1, fig. 2 (1849). Butler, Proc. Zool. Soc. 1884, p. 491.
- Callosune Saxeus*, *Teracolus Saxeus*, Swinhoe, Proc. Zool. Soc. 1884, p. 441, pl. 40, figs. 1, 2. Butler, Proc. Zool. Soc. 1884, p. 491.
- Callosune Epigone*, *Anthopsyche Epigone*, Felder, Reise Nov. ii. p. 186 (1865). Butler, Proc. Zool. Soc. 1884, p. 490.
- Callosune Miles*, *Teracolus Miles*, Butler, Ann. Mag. Nat. Hist. 1883, p. 105.
- Madais Vi*, *Teracolus Vi*, Swinhoe, Proc. Zool. Soc. 1884, p. 437, pl. 39, figs. 6, 7. Butler, Proc. Zool. Soc. 1884, p. 488.

Genus EURYMUS.

- Eurymus*, Swainson, Horsfield's Cat. Lep. E.I.C. pp. 129 to 134 (1829); id. Zool. Ill. ii. pl. 60 (1831). Scudder, Butt. U. States, ii. p. 1096 (1889). Kirby, Allen's N. L. Butt. ii. p. 208 (1896).
- Colias*, Fabricius (part), Illiger's Mag. Ins. vi. p. 284 (1807). Latreille, Enc. Méth. ix. pp. 10, 89 (1819). Boisduval, Spéc. Gen. Lep. i. p. 634 (1836). Doubleday, Gen. D. Lep. p. 72 (1847). Butler, Cist. Ent. i. pp. 35, 43 (1870). Schatz, Sch. Exot. ii. p. 68 (1866). Bingham, Fauna of Brit. India, Butt. ii. p. 232 (1907).
- Eriocolias*, Watson, Entom. 1895, p. 167.

Type, *Hyale*, Linnæus (European).

Antennæ short, with a large but gradually-formed club. *Palpi* long, compressed, scaly, and somewhat bristly, the terminal joint short. *Tarsi* without appendages. *Wings* rather short and broad; the *Hindwings* rounded, the *Forewing* with the cell rather short and broad, the *Hindwing* with the cell rather long and narrow. *Forewing* with the apex slightly rounded off, the sub-costal nervure four-branched, the first branch emitted before end of cell, the second at or beyond the end, the third and fourth forming a small fork at the tip of the wing; the upper radial is thrown off from the sub-costal considerably beyond the cell; middle discocellular short, straight, lower one long, slightly curved, oblique and somewhat angulated.

The "clouded yellow" form a very distinct group, and are very numerous in species, especially in Central Asia. The males are generally of a yellow colour, varying from light sulphur-yellow to deep orange, the latter being sometimes flushed with purple, so deep in one or two instances as to appear almost black; some species are of a dull green. Some of the females are coloured like the males, many are Albinos, and

often the same species have many examples of both females, many females also exhibit Albino patches.

The *Larvæ* are green, smooth, pubescent, and feed on *Leguminosæ*. The *Pupa* is pointed in front.

Watson's *Eriocolias* is intended to include the *Hyale* group, in which the border is often streaked, but never spotted in the male; the principal character is that the males have, on the upperside of the hindwings, between the costal and sub-costal nervures, a patch of modified scales of a smaller size, and much more numerous than the surrounding scales, usually of the same ground colour; in the old genus *Colias* (our *Eurymus*) Watson proposes to retain the orange species in which these scales are wanting (*E. Chrysotheme*, Esper, etc.) and the sub-group represented by *E. Phiconome*, Esper, improperly indicated as the type, as it is not even one of the species mentioned in Illiger's Mag.; pending a critical examination of the numerous species of this genus, which might probably reveal other characters of greater importance, we content ourselves by calling attention to Watson's genus, without adopting at present a sub-division which would separate species so much resembling each other as *C. Hyale* and *C. Chrysotheme*, solely on a secondary sexual character, however well marked or constant.

EURYMUS ERATE.

Plate 602, figs. 1, ♂, 1a, ♀, 1b, ♂ (Wet-season Brood), 1c, ♀ (Albino), 1d, ♂, 1e, ♀ (Dry-season Brood).

Papilio Erate, Esper, Ausl. Schmett. i. (2), pl. 119, fig. 3 (1806).

Colias Erate, Butler, Proc. Zool. Soc. 1880, p. 409; id. 1881, p. 607; id. 1886, p. 370. Elwes, Trans. Ent. Soc. 1884, p. 23. Butler, Ann. Mag. Nat. Hist. 1882, p. 3. Moore, Proc. Zool. Soc. 1882, p. 255. Swinhoe, Trans. Ent. Soc. 1885, p. 344. Butler, Ann. Mag. Nat. Hist. 1888, p. 196. Mackinnon and de Nicéville, Journ. Bo. Nat. Hist. Soc. 1898, p. 588. Leslie and Evans, Journ. Bo. Nat. Hist. Soc. 1903, p. 675.

Colias Neriene, Fischer, Ent. Ross. ii. Lep. p. 251, pl. 11, figs. 3, 4 (1823).

Colias Hyale, Butler (nec Linnaeus), Proc. Zool. Soc. 1870, p. 727, and 1874, p. 273. Moore, 2nd Yarkand Miss. p. 4 (1879). Doherty, Journ. As. Soc. Bengal, 1886, p. 136. Bingham (part), Fauna of Brit. India, Butt. ii. p. 234 (1907).

Colias lativitta, Moore, Proc. Zool. Soc. 1882, p. 255.

Wet-season Brood (Figs. 1, ♂, 1a, ♀, 1b, ♂).

IMAGO.—Male. Upperside lemon-yellow. *Forewing* with a small space at the base irrorated with dark-grey scales, costal line to the outer band also with grey scales, its base usually with a short orange streak, an oval black spot at the end of the cell, a deep black immaculate band on the exterior border, commencing on the costa one-third from the apex, its inner margin oblique outwardly to vein 4, then runs down to the

lower margin, is sinuous and has one or two curves in it; in some examples there are two or three obscure pale sub-apical streaks within the band, but usually it is without markings. *Hindwing* with some grey irrorations on the basal half, a large round orange spot at the end of the cell, and a black immaculate band on the exterior border, moderately broad in its middle, sinuous in its inner margin, narrowing rapidly both upwards and hindwards, never reaching the anal angle; costal space whitish, cilia of both wings white with orange tips. Underside much darker yellow, the hindwing darker than the forewing. *Forewing* with a large black white-centred oval spot at the end of the cell, a discal row of five brown spots running evenly with the margin, two small brown spots on the costa above them. *Hindwing* with slight greenish-grey irrorations on the inner portion, a large round, white shining spot with a small one close above it, at the end of the cell, both encircled with two red-brown rings, between which the colour is pale red-brown, a brown mark in the middle of the costa and a discal row of red-brown dots, one in each interspace, running evenly with the outer margin, cilia of both wings orange-red. Antennæ, head and front of thorax in both sexes salmon-pink, the rest of the thorax and abdomen greenish-black, with some white hairs on the former, beneath they are pale yellow, legs pinkish.

Female. Upperside coloured as in the male, but always paler. *Forewing* with the exterior black band similar in shape, but usually broader, and always with five or six largish spots of various sizes in the middle of the band, four or five sub-apical, the two lowest the largest, a large one a little below the middle and a small one close below it. *Hindwing* with the orange cell spot larger, the outer band composed of large black spots in the interspaces, joined together and widened at the apex with a yellow spot in it and continued up to the beginning of the costal pale space. Underside as in the male.

Expanse, ♂ ♀ $2\frac{1}{10}$ to $2\frac{2}{10}$ inches.

Dry-season Brood (Figs. 1d, ♂, 1e, ♀).

Male and female paler than in the Wet-season form, some of the females almost whitish, the markings similarly disposed, but the bands very narrow in both sexes, and some of the spots on the exterior border of the female above are often obsolescent; in the outer border of the forewing of the male above there are frequently several pale diffuse streaks.

Expanse, ♂ ♀, $1\frac{8}{10}$ to $1\frac{9}{10}$ inches.

HABITAT.—Afghanistan, Beloochistan and the Himalayas.

DISTRIBUTION.—We took it in great numbers in Kandahar and Quetta, and it is in our collection from Cashmir, Kulu Murree and Campbellpur (Yerbury); Doherty reports it from Kunawur and Naini Tal, Moore from Yarkand, Mackinnon and de Nicéville from Mussuri, and Leslie and Evans from Chitral; Moore's type of *Lativitta* came

from Nepal ; the species has a long range, extending throughout the Palearctic Regions of Asia ; Esper's type came from South Russia.

NOTE.—Both forms (*Erate* and *Glicia*) have Albino females ; I took white females in cop. with both kinds of males ; different in flight and habits to *Fieldii*, twice as fast in flight and hardly ever settling (Lang's notes).

EURYMUS GLICIA.

Plate 602, figs. 2, ♂, 2a, ♀ (Wet-season Brood), 2b, ♂, 2c, ♀, 2d, ♂ (Dry-season Brood).

Colias Hyale Glicia, Fruhstorfer (ined.) in Seitz Gross Schmett. ii., Fauna, Indo-Australica, pl. 9, figs. ♂ ♀ (1909).

Colias Sareptensis, Butler (nec Staudinger), Proc. Zool. Soc. 1880, p. 409 ; id. Ann. Mag. Nat. Hist. 1882, p. 3. Swinhoe, Trans. Ent. Soc. 1885, p. 344. Butler, Proc. Zool. Soc. 1886, p. 371 ; id. Ann. Mag. Nat. Hist. 1888, p. 197.

Colias Hyale, Leslie and Evans (nec Linnaeus), Journ. Bo. Nat. Hist. Soc. 1903, p. 675. Bingham (part), Fauna of Brit. India, Butt. ii. p. 234 (1907).

Wet-season Brood (Figs. 2, ♂, 2a, ♀).

IMAGO. Male. Upperside pale lemon-yellow, always paler than *Erate*, some of the males very pale. *Forewing* marked like the female of *Erate*, the apical portion of the pale spots within the exterior black band generally joined together. *Hindwing* with the orange cell spot smaller and paler, sometimes obsolescent, the band on the exterior border macular, the spots smaller and the band seldom thickened at its upper end, sometimes the lower spots are quite small. Underside as in *Erate*, but the spots are smaller and the colour of the wings paler.

Female. Upperside pale primrose to pure white, both wings marked as in the male. Underside also as in the male.

Expanse, ♂ ♀ 2 inches.

Dry-season Brood (Figs. 2b, ♂, 2c, ♀, 2d, ♀).

Male. Upperside as in the Wet-season form, but the outer black band of the forewing is seldom brought down to the lower angle, and the outer band of the hindwing is very faintly indicated, often represented by a few grey marks. Underside as in the Wet-season form.

Female. Like the female of the Wet-season form, but the spots on the outer band of the forewing are smaller and often fewer in number, the outer band of the hindwing with smaller spots ; on the underside the hindwing is greenish, being covered with minute green-grey scales.

Expanse, ♂ ♀ $1\frac{4}{10}$ to $1\frac{8}{10}$ inches.

HABITAT.—Afghanistan, Beloochistan and the Himalayas.

DISTRIBUTION.—We caught it flying with *Erate* in the same localities and quite as numerous, and it appears to extend throughout the same regions. There are many more Albino females than in *Erate*; the types came from Cashmir; we have it from many localities in North-Western India.

EURYMUS CHRYSODONA.

Plate 603, figs. 2, ♂, 2a, ♀, 2c, ♀ (Wet-season Brood), 2b, ♂, 2d, ♀ (Dry-season Brood).

Colias Neriene, var. *Chrysodona*, Boisduval, Gen. Ind. Mith. p. 7 (1840).

Colias Hyale, var. *Chrysodona*, Elwes, Trans. Ent. Soc. 1884, p. 23.

Colias Erate ab. *Chrysodona*, Verity, Rhop. Palearctica, p. 219, pl. 40, figs. 27, 28 (1909).

Colias Neriene, Wallace (nec Fischer), Trans. Ent. Soc. 1867, p. 391.

Colias Helichta, Lederer, Verh. Zool.-bot. Ges. Wien, ii. p. 33 (1853). Butler, Proc. Zool. Soc. 1880, p. 408. Swinhoe, Trans. Ent. Soc. 1885, p. 343.

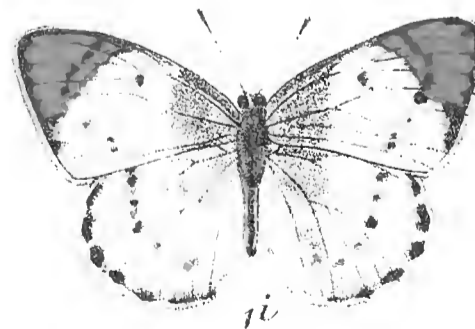
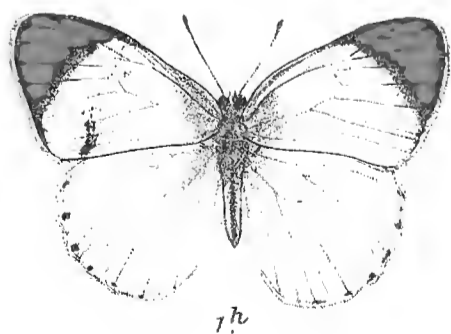
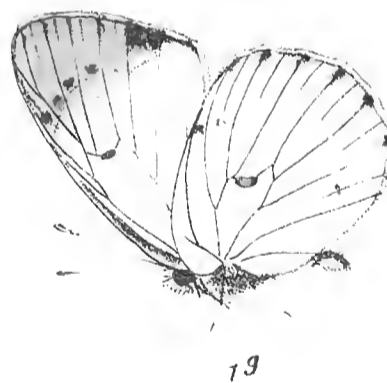
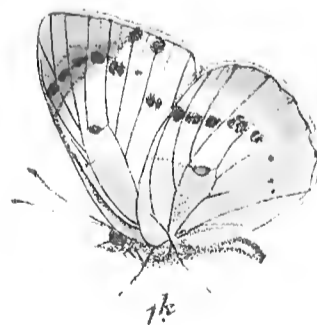
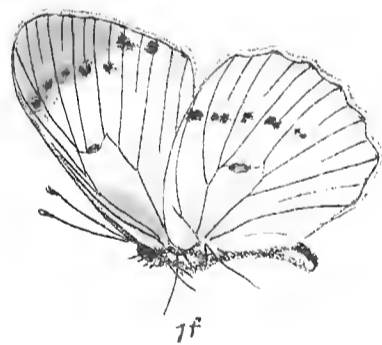
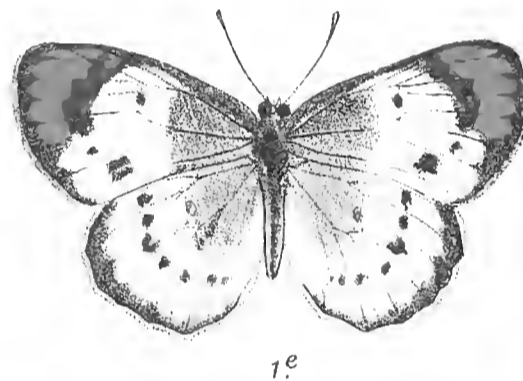
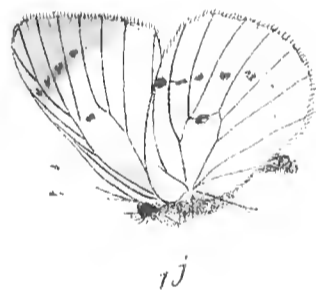
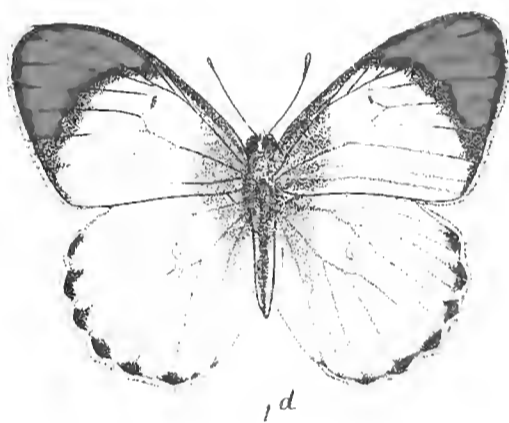
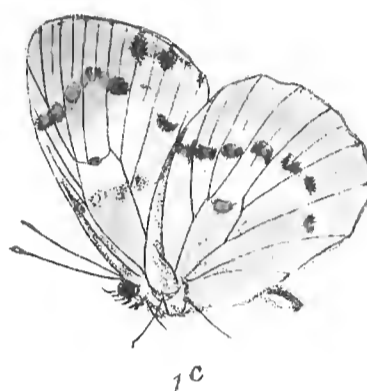
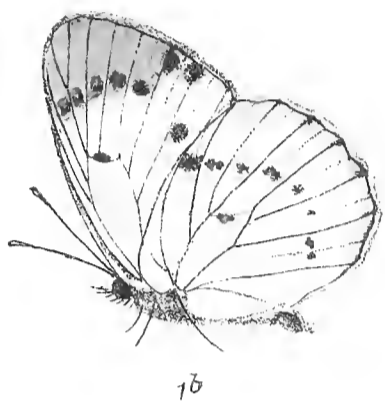
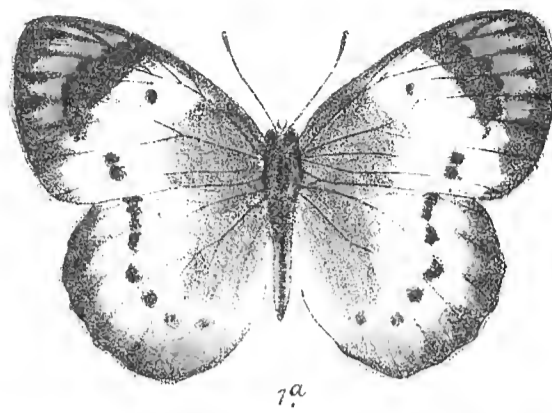
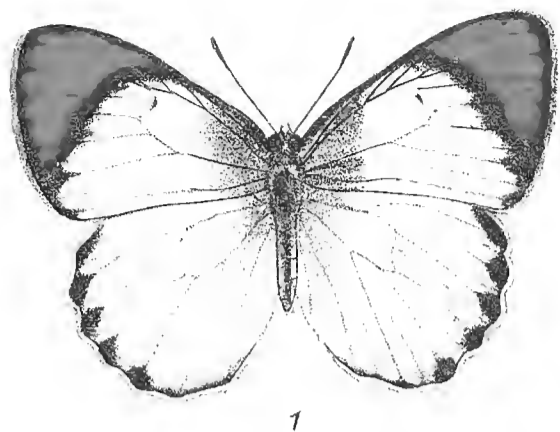
Colias Hyale, Bingham (part), Fauna of Brit. India, Butt. ii. p. 234 (1907).

Wet-season Brood (Figs. 2, ♂, 2a, ♀, 2c, ♀).

IMAGO. Male. Upperside deep orange-yellow. *Forewing* with a small patch of blackish irrorations at the base, costal line orange, a large nearly round black spot at the end of the cell, and a broad black outer marginal band, occupying one-fourth of the wing, broadest at the apex, its inner edge oblique towards the outer margin, then almost even in width to the lower margin, its inner edge as usual irregular; cilia white and pink. *Hindwing* with the basal two-thirds lightly irrorated with blackish-grey scales, a large orange spot at the end of the cell; costal space pale, an apical short black band not reaching the anal angle, its inner edge irregular. Underside pale chrome-yellow. *Forewing* with a round black, white-centred cell spot, and a discal row of black spots, decreasing in size upwards, and two brown costal spots on their inner side. *Hindwing* with green irrorations, a brown sub-apical, costal spot, a large round white cell spot with a small one above it, both ringed with orange-brown, and a discal row of brown dots; cilia whitish.

Female. Upperside varying in colour, from deep orange-yellow to pale chrome-yellow. *Forewing* with the cell spot larger, and the marginal band broader than in the male, containing five or six pale spots, usually paler than the ground colour, four from the costa, a large one below the middle and very often a small one beneath; a few grey irrorations at the base of the wing. *Hindwing* with a band of faintly indicated, very large spots on the exterior border, outwardly, and at the apex heavily, marked with black, the inner side of the spots faintly marked by a thin blackish band; the interior portion of the wing irrorated with pale-grey scales; a large orange spot at the end of the cell; cilia as in the male. Underside in all respects as in the male.

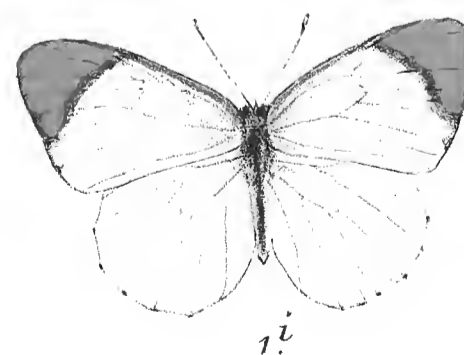
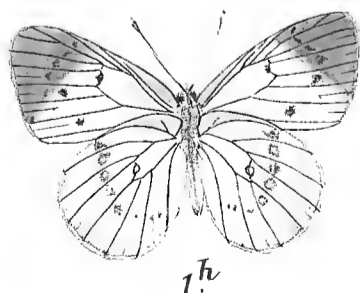
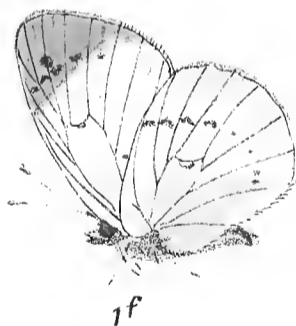
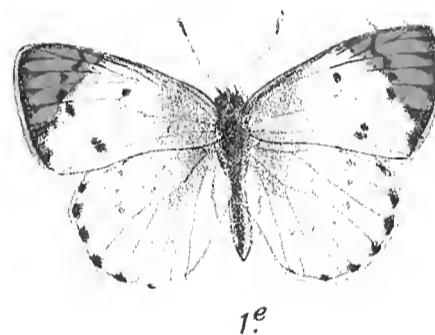
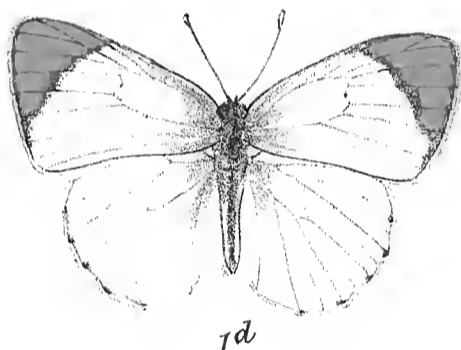
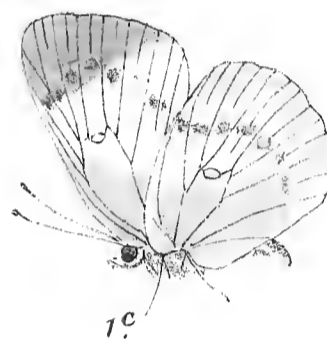
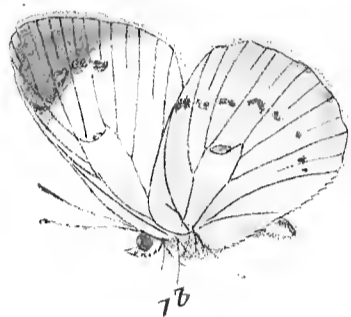
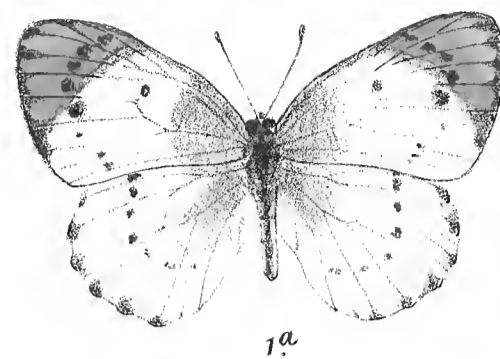
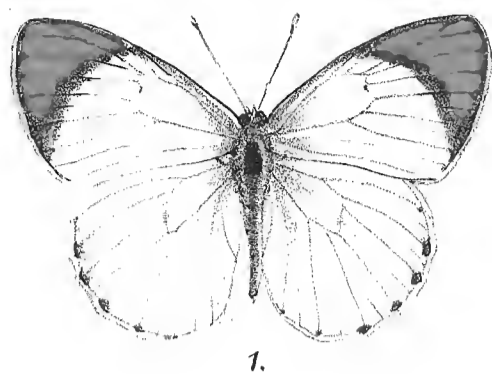
Expanse, ♂ ♀ $2\frac{1}{10}$ to $2\frac{2}{10}$ inches.



J.N.Fitch del. et hth.

Vincent Brooks Day & Son. Lith. in p.

L. Reeve & Co. London.



J.N. Fitch del et lith

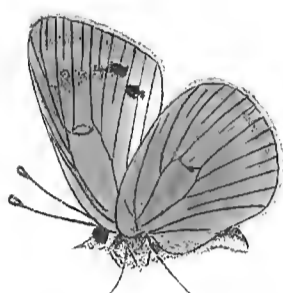
Vincent Brooks Day & Son Lit imp



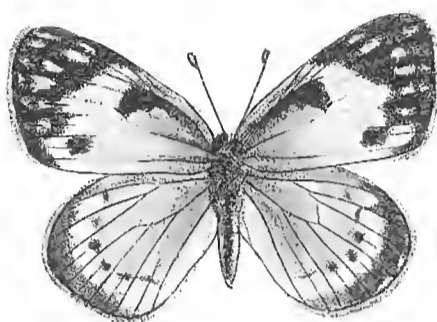
1



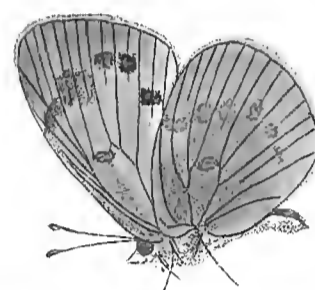
1^a



1^b



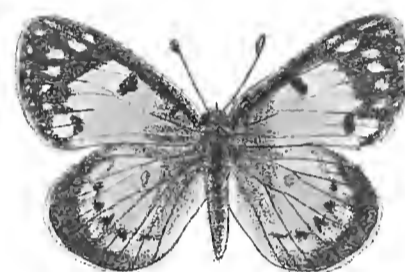
1^d



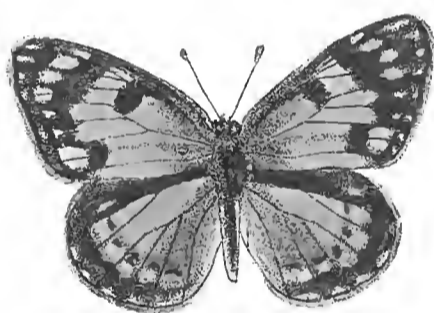
1^c



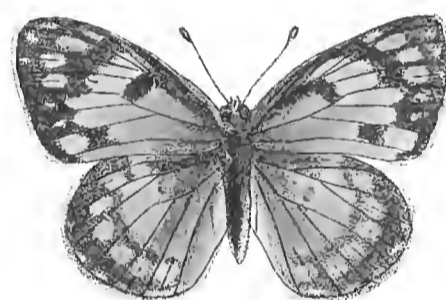
1^e



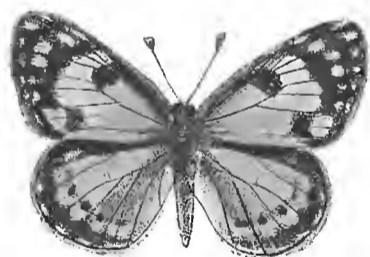
1^f



2



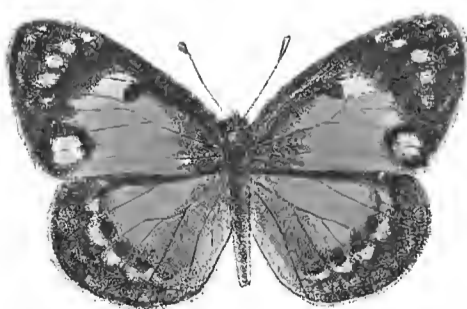
2^a



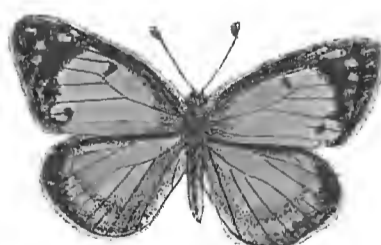
2^b



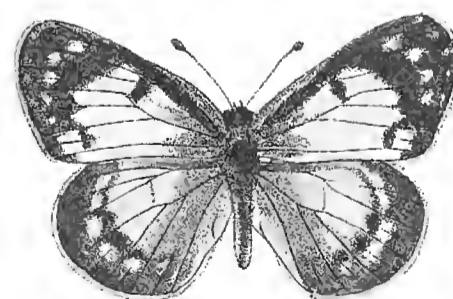
2^c



3



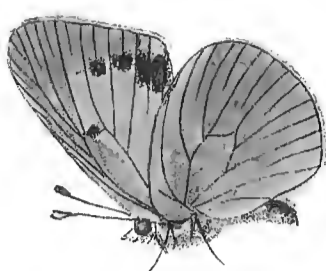
3^b



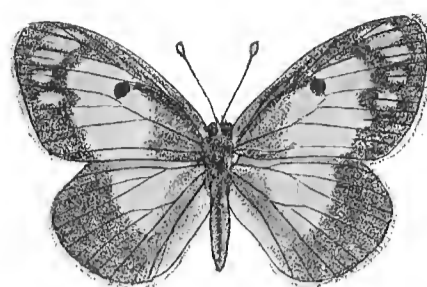
3^a



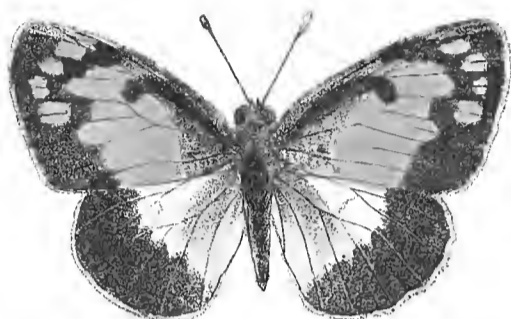
1.



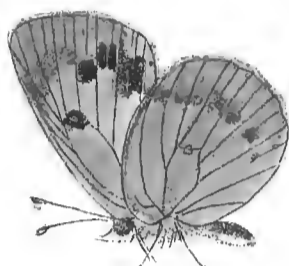
1^b



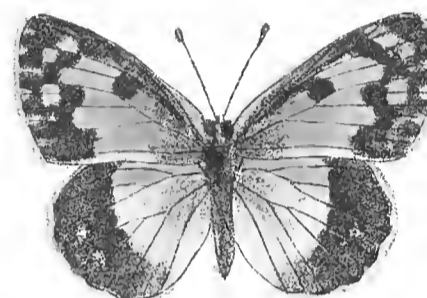
1^a



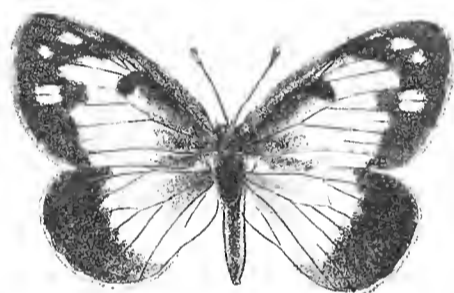
2.



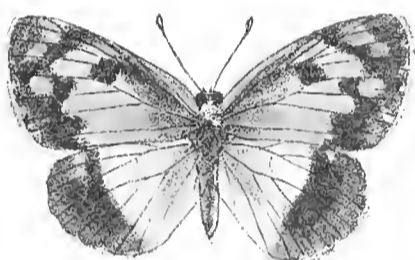
2^b



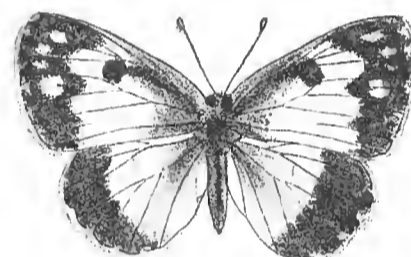
2^a



3



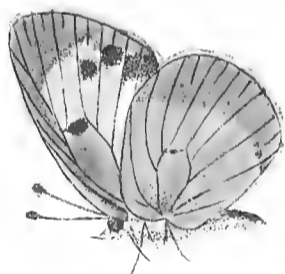
2^c



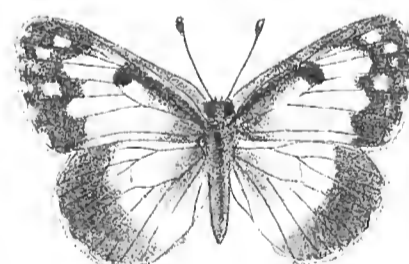
3^a



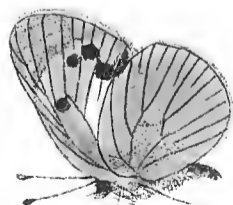
3^d



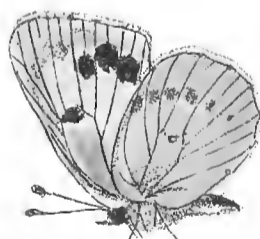
3^b



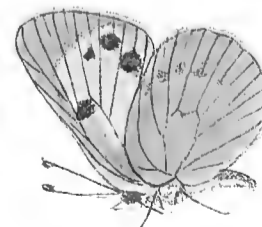
3^e



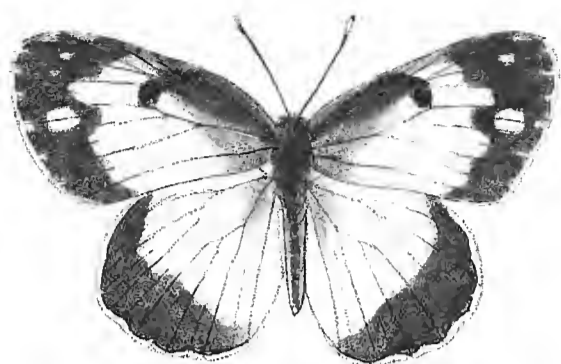
3^f



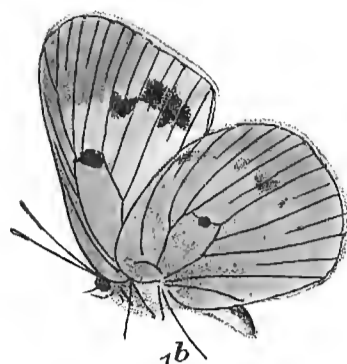
3^c



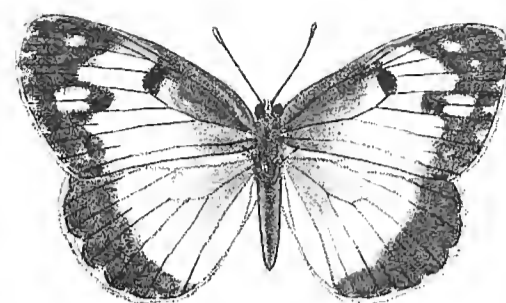
3^g



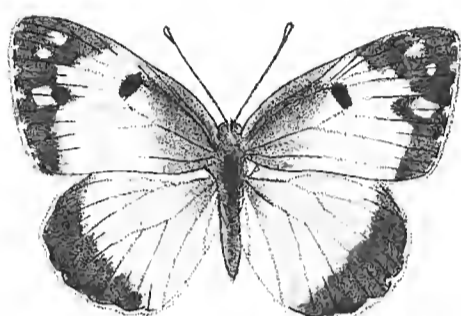
1.



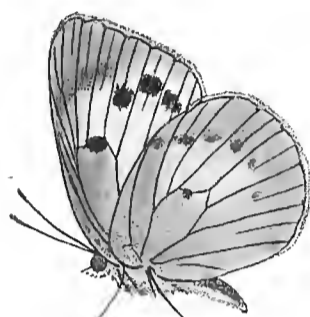
1^b



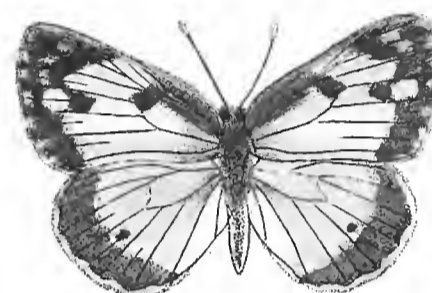
1^a



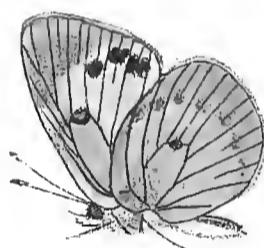
1^d



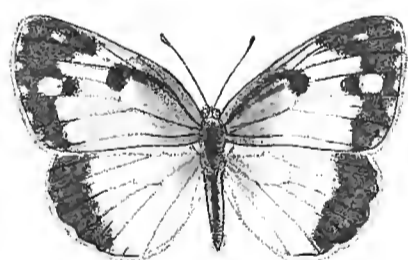
1^c



1^e



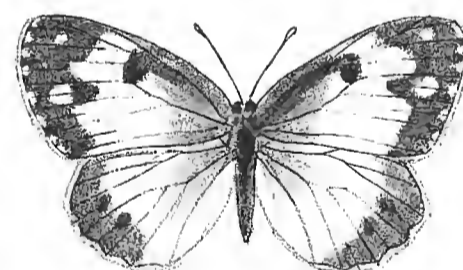
2^b



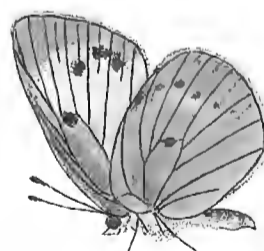
2



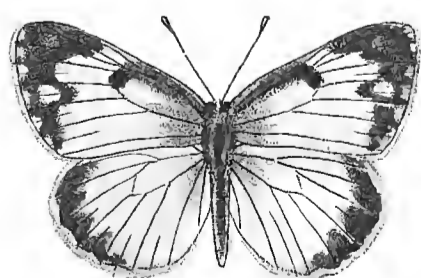
2^c



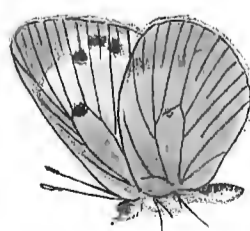
2^a



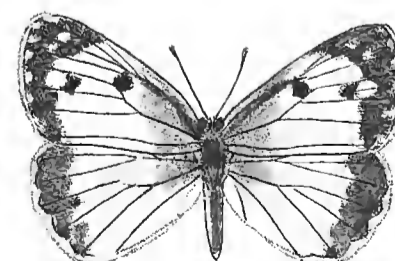
2^f



2^d



2^g

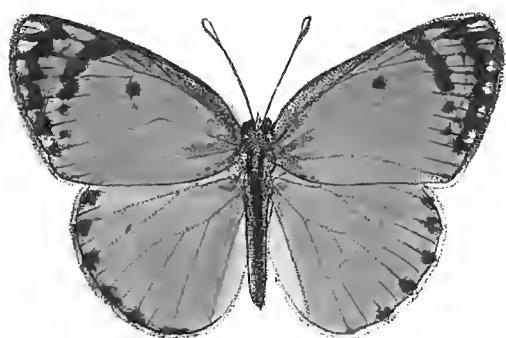


2^e

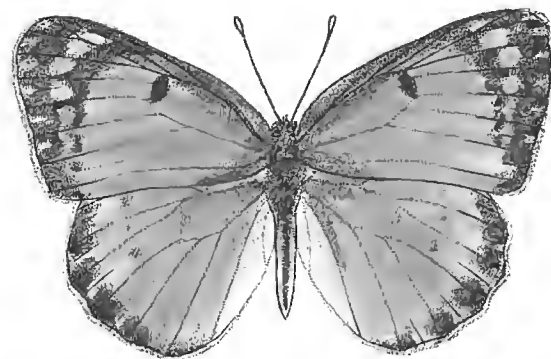
J.N. Fitch del. et lith.

L. Reeve & C^o. London.

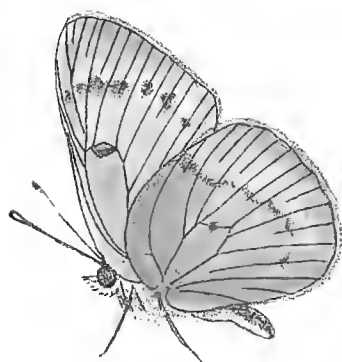
Vincent Brooks Day & Son Lith. & imp.



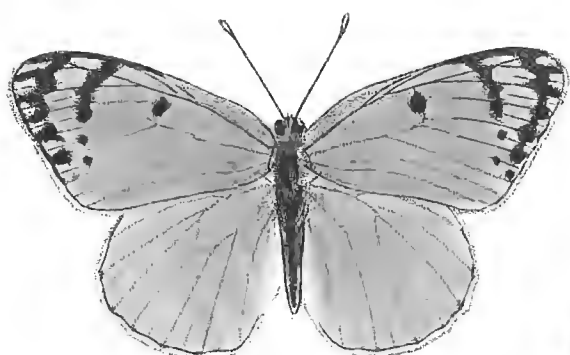
1



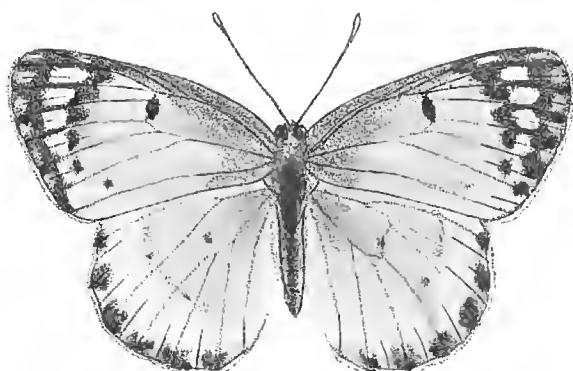
1^a



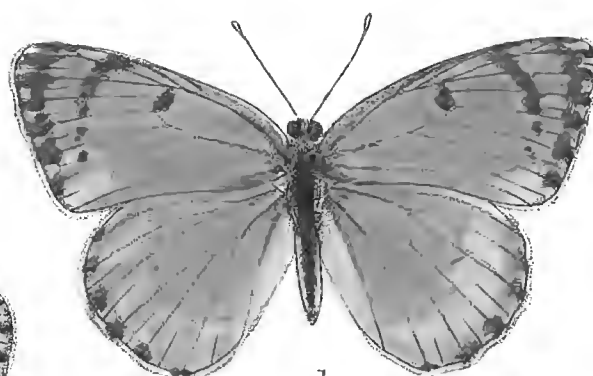
1^b



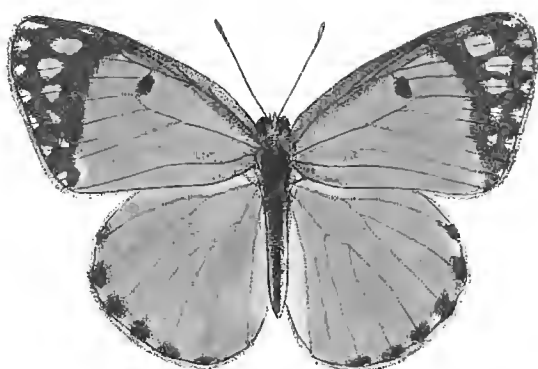
1^c



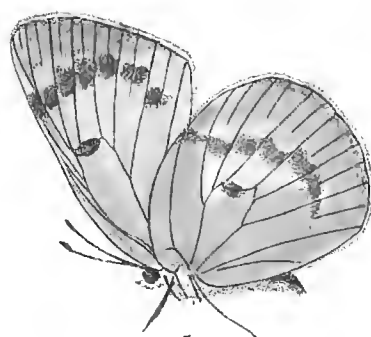
1^e



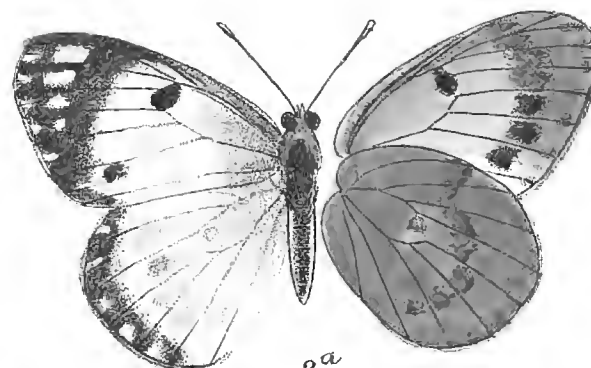
1^d



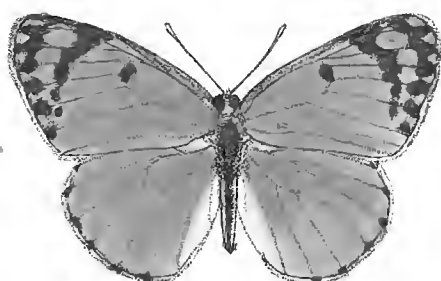
2.



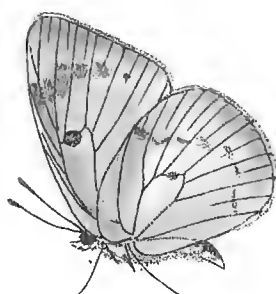
2^b



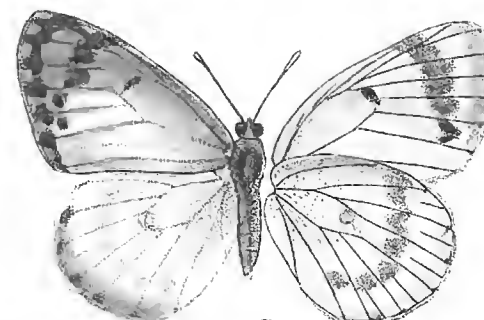
2^a



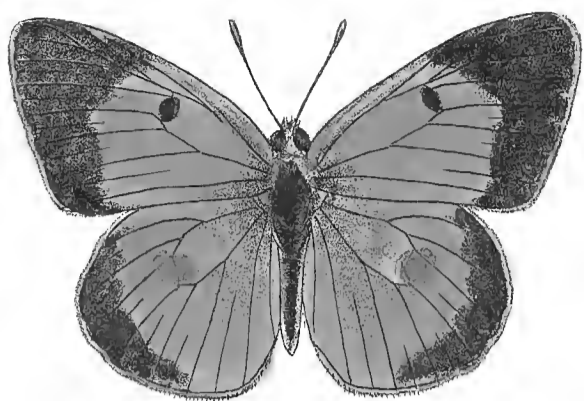
2^c



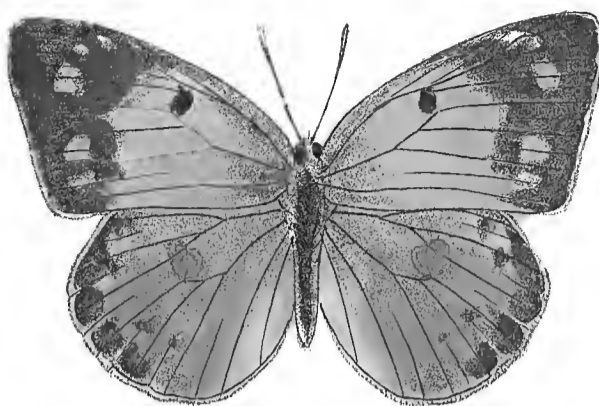
2^e



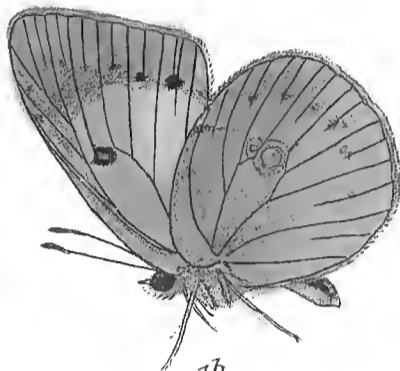
2^d



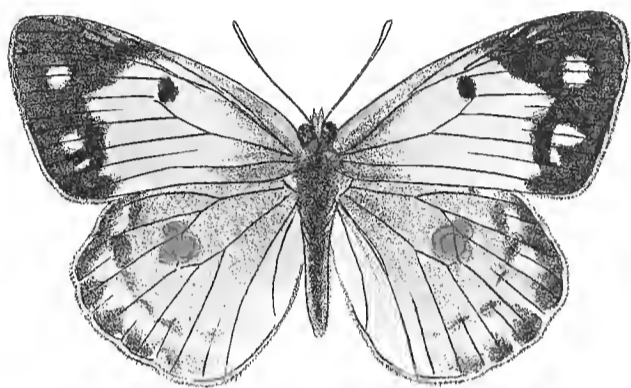
1.



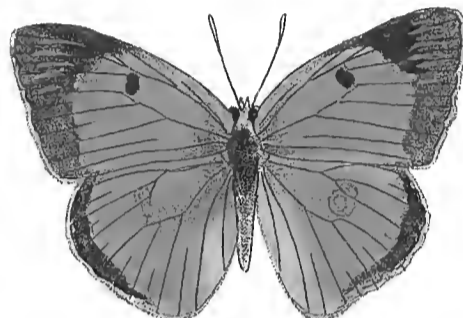
1a



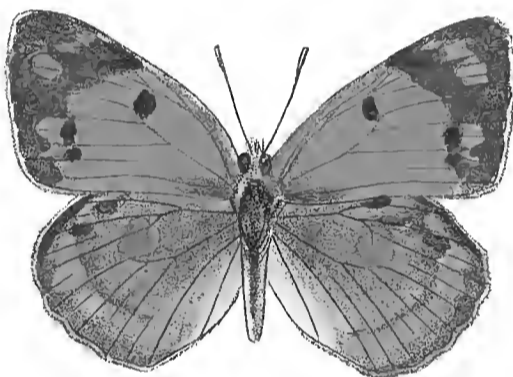
1b



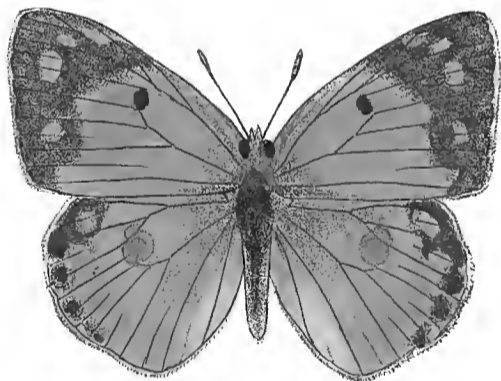
1c



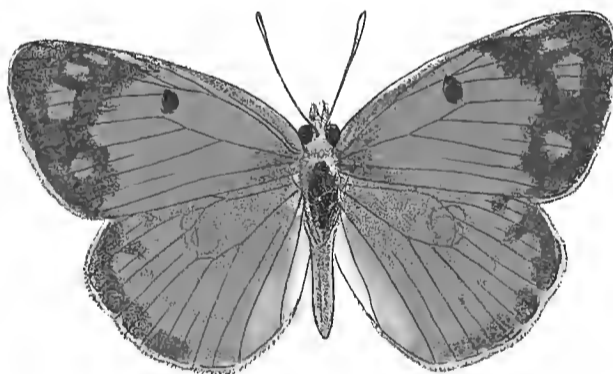
1d



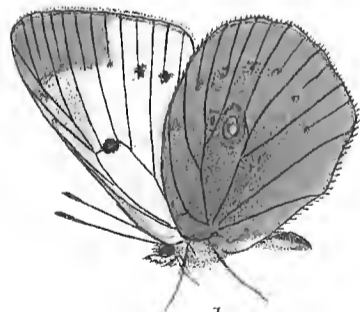
1e



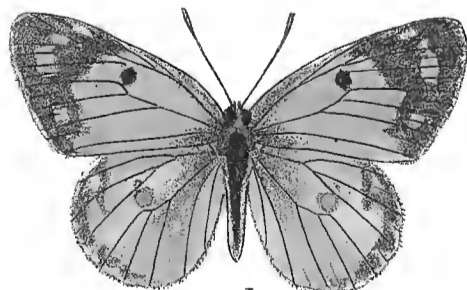
2.



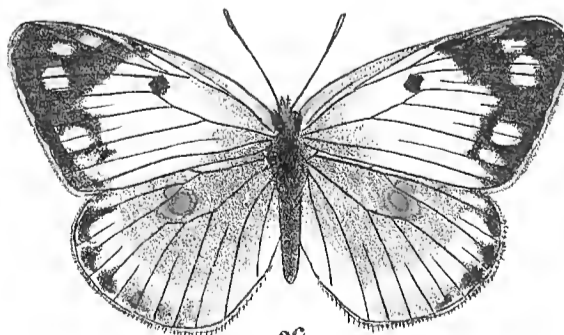
2a



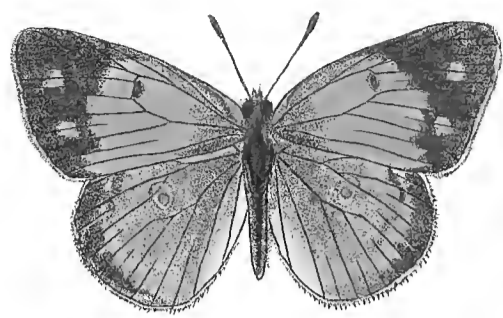
2b



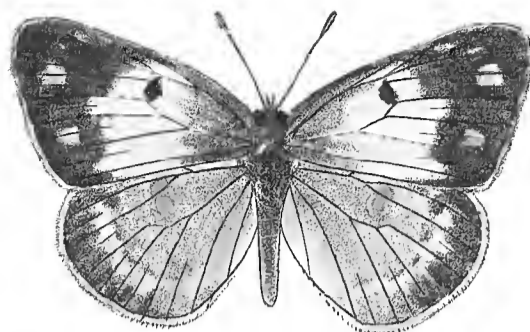
2c



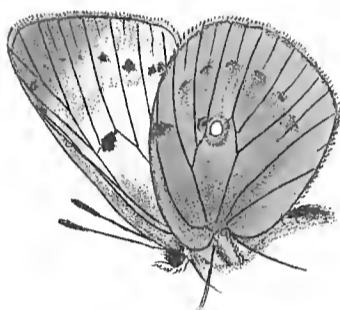
2d



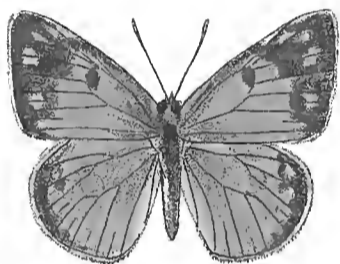
1.



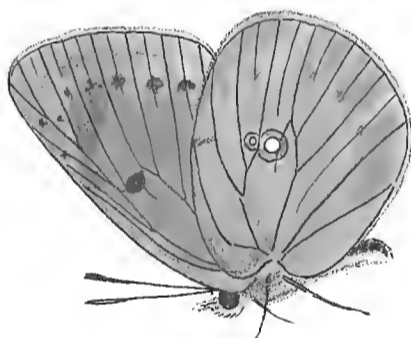
1^a



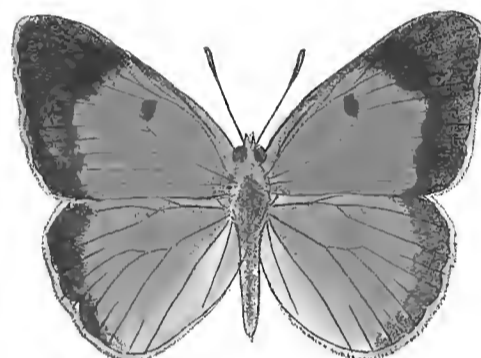
1^c



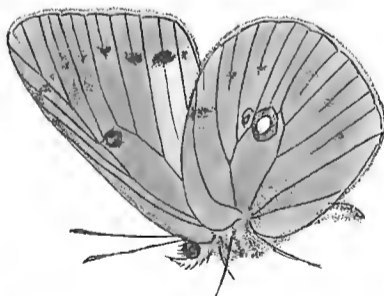
1^b



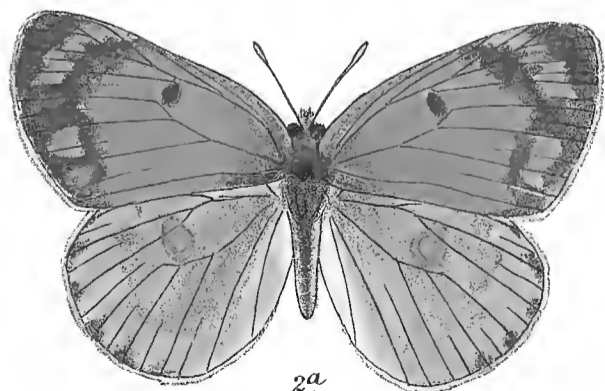
2^c



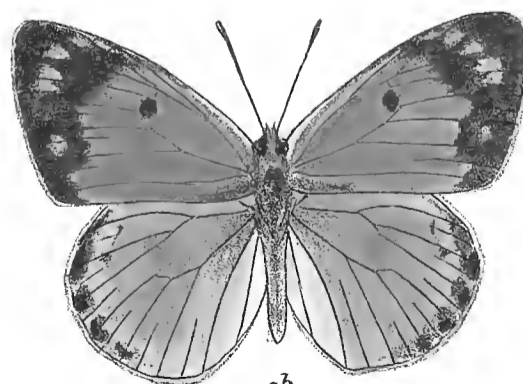
2.



2^d



2^a



2^b

J.N.Fitch del. et lith.

Vincent Brooks, Day & Son Lith. imp.

L. Reeve & Co. London.

LOVELL REEVE & CO.'S PUBLICATIONS—*Continued.*

The Narcissus, its History and Culture, with Coloured Figures of all known Species and Principal Varieties. By F. W. BURBIDGE, and a Review of the Classification by J. G. BAKER, F.L.S. Super-royal 8vo, 48 Coloured Plates, 30s.

British Wild Flowers, Familiarly Described in the Four Seasons. By THOMAS MOORE, F.L.S. 24 Coloured Plates, 14s.

British Grasses; an Introduction to the Study of the Gramineæ of Great Britain and Ireland. By M. PLUES. Crown 8vo, with 16 Coloured Plates and 100 Wood Engravings, 9s.

British Ferns; an Introduction to the Study of the FERNS, LYCOPODS, and EUISETA indigenous to the British Isles. With Chapters on the Structure, Propagation, Cultivation, Diseases, Uses, Preservation, and Distribution of Ferns. By M. PLUES. Crown 8vo, 16 Coloured Plates, and 55 Wood Engravings, 9s.

The British Ferns; Coloured Figures and Descriptions, with Analysis of the Fructification and Venation of the Ferns of Great Britain and Ireland. By Sir W. J. HOOKER, F.R.S. Royal 8vo, 66 Coloured Plates, 36s.

Garden Ferns; Coloured Figures and Descriptions of a Selection of Exotic Ferns, adapted for Cultivation in the Garden, Hothouse, and Conservatory. By Sir W. J. HOOKER, F.R.S. Royal 8vo, 64 Coloured Plates, 36s.

Filices Exoticæ; Coloured Figures and Description of Exotic Ferns. By Sir W. J. HOOKER, F.R.S. Royal 4to, 100 Coloured Plates, £6 11s.

Handbook of British Mosses, containing all that are known to be natives of the British Isles. By the Rev. M. J. BERKELEY, M.A., F.L.S. 24 Coloured Plates, 21s.

Synopsis of British Mosses, containing Descriptions of all the Genera and Species (with localities of the rare ones) found in Great Britain and Ireland. By CHARLES P. HOBKIRK, F.L.S. New Edition, entirely revised. Crown 8vo, 6s. 6d.

British Fungi, Phycomycetes and Ustilagineæ. By GEORGE MASSEE. 8 Plates, 6s. 6d.

British Fungology. By the Rev. M. J. BERKELEY, M.A., F.L.S. Re-issue with a Supplement of nearly 400 pages by Worthington G. Smith, F.L.S., bringing the work up to the present time. 2 vols. 24 Coloured Plates, 36s.

The Esculent Funguses of England. Containing an Account of their Classical History, Uses, Characters, Development, Structure, Nutritious Properties, Modes of Cooking and Preserving, &c. By C. D. BADHAM, M.D. Second Edition. Edited by F. CURREY, F.R.S. 12 Coloured Plates, 12s.

The Uses of British Plants. Traced from Antiquity to the Present Day, together with the Derivations of their Names. By the Rev. Prof. G. HENSLOW, M.A., F.L.S. With 288 Illustrations. Crown 8vo, 4s. 6d.

The Potamogetons of the British Isles: Descriptions of all the Species, Varieties and Hybrids. By ALFRED FRYER. Illustrated by ROBERT MORGAN, F.L.S. Sections 1-3, each 21s. Coloured; 15s. uncoloured.

Phycologia Britannica; or, History of British Seaweeds. By Dr. W. H. HARVEY, F.R.S. New Edition. Royal 8vo, 4 vols. 360 Coloured Plates, £6 6s.

Phycologia Australica; a History of Australian Seaweeds, Comprising Coloured Figures and Descriptions of the more characteristic Marine Algæ of New South Wales, Victoria, Tasmania, South Australia, and Western Australia, and a Synopsis of all known Australian Algæ. By Dr. W. H. HARVEY, F.R.S. Royal 8vo, Five Vols., 300 Coloured Plates, £6 10s.

British Seaweeds; an Introduction to the Study of the Marine ALGÆ of Great Britain, Ireland, and the Channel Islands. By S. O. GRAY. Crown 8vo, with 16 Coloured Plates, 9s.

West Yorkshire; an Account of its Geology, Physical Geography, Climatology, and Botany. By J. W. DAVIS, F.L.S., and F. ARNOLD LEES, F.L.S. Second Edition, 8vo, 21 Plates, many Coloured, and 2 large Maps, 21s.

Natal; a History and Description of the Colony, including its Natural Features, Productions, Industrial Condition and Prospects. By HENRY BROOKS, for many years a resident. Edited by Dr. R. J. MANN, F.R.A.S., F.R.G.S., late Superintendent of Education in the Colony. Demy 8vo, with Maps, Coloured Plates, and Photographic Views, 18s.

St. Helena. A Physical, Historical, and Topographical Description of the Island, including its Geology, Fauna, Flora, and Meteorology. By J. C. MELLISS, A.I.C.E., F.G.S., F.L.S. In one large Vol., Super-royal 8vo, with 56 Plates and Maps, mostly coloured, 36s.

Handbook of the Vertebrate Fauna of Yorkshire; being a Catalogue of British Mammals, Birds, Reptiles, Amphibians, and Fishes, which are or have been found in the County. By WILLIAM EAGLE CLARKE and WILLIAM DENISON ROEBUCK. 8vo, 8s. 6d.

The Structure and Life History of the Cockroach (*Periplaneta Orientalis*). An Introduction to the Study of Insects. By L. C. MIALI, Professor of Biology in the Yorkshire College, Leeds, and ALFRED DENNY, Lecturer on Biology in the Firth College, Sheffield. Demy 8vo, 125 Woodcuts, 7s. 6d.

LOVELL REEVE & CO., LTD., 6, HENRIETTA STREET, COVENT GARDEN.

LOVELL REEVE & CO.'S PUBLICATIONS—*Continued.*

Monographiæ Entomologicæ. I. A Mono-
graph of the genus *TERACOLUS*. By E. M. BOWDLER
SHARPE. Parts 1-11, 4to, with Four Coloured
Plates, 7s. 6d. each.

Monographiæ Entomologicæ. II. A Mono-
graph of the *MEMBRACIDÆ*. By GEORGE BOWDLER
BUCKTON, F.R.S., F.L.S. 4to, with 60 Coloured
Plates, £6 15s.

Foreign Finches in Captivity. By ARTHUR
G. BUTLER, Ph.D., F.L.S., F.Z.S., F.E.S. Complete
in One Vol., royal 4to, with 60 Coloured Plates,
£4 14s. 6d.

The Lepidoptera of Ceylon. By F. MOORE,
F.L.S. Three Vols., Medium 4to, 215 Coloured
Plates, cloth, gilt tops, £21 12s. Published under
the auspices of the Government of Ceylon.

The Butterflies of Europe; Illustrated and
Described. By HENRY CHARLES LANG, M.D.,
F.L.S. Complete in Two Vols., super-royal 8vo,
with 82 Coloured Plates, containing upwards of 900
Figures, cloth, £3 18s.

The Hemiptera Heteroptera of the British
Islands. By EDWARD SAUNDERS, F.L.S. Complete
in 1 vol. Small Edition, with a Structural Plate,
14s. Large Edition, with 31 Coloured Plates, 48s.

The Lepidoptera of the British Islands.
By CHARLES G. BARRETT, F.E.S. Complete in
11 vols, £6 12s. Large Paper Edition, with 504
Coloured Plates, £33 15s.

The Larvæ of the British Lepidoptera, and
their Food Plants. By OWEN S. WILSON. With Life-
sized Figures drawn and coloured from Nature by
ELEANOR A. WILSON. 40 Coloured Plates, 63s.

The Coleoptera of the British Islands. By
the Rev. Canon FOWLER, M.A., F.L.S. Complete in
Five Vols. Large Edition, with 180 Coloured
Plates, £14. Small Edition, with Two Structural
Plates, £4

Catalogue of British Coleoptera. By D.
SHARP, M.A., F.R.S., and Rev. Canon FOWLER,
M.A., F.L.S. Price 1s. 6d.

The Hymenoptera Aculeata of the British
Islands. By EDWARD SAUNDERS, F.L.S. Complete
with 3 Plates, 16s. Large Paper Edition, with 49
Coloured Plates, 68s.

The Hemiptera Homoptera of the British
Islands. By JAMES EDWARDS, F.E.S. Complete
with a structural plate, 14s. Large Edition, with
31 Coloured Plates, 48s.

British Insects. A Familiar Description
of the Form, Structure, Habits, and Transformations
of Insects. By E. F. STAVELEY, Author of "British
Spiders." Crown 8vo, with 16 Coloured Plates and
numerous Wood Engravings, 12s.

British Beetles; an Introduction to the
Study of our indigenous *COLEOPTERA*. By E. C.
RYE. Second Edition, revised and in part rewritten
by the Rev. Canon FOWLER, M.A., F.L.S. Crown
8vo, 16 Coloured Steel Plates, and 11 Wood Engrav-
ings, 9s.

British Butterflies and Moths; an Intro-
duction to the Study of our Native *LEPIDOPTERA*.
By H. T. STAINTON. Crown 8vo, 16 Coloured
Plates, and Wood Engravings, 9s.

British Bees; an Introduction to the Study
of the Natural History and Economy of the Bees
indigenous to the British Isles. By W. E. SHUCKARD.
Crown 8vo, 16 Coloured Plates and Woodcuts of
Dissections, 9s.

British Spiders; an Introduction to the
Study of the *ARANEIDÆ* found in Great Britain and
Ireland. By E. F. STAVELEY. Crown 8vo, 16
Coloured Plates and 44 Wood Engravings, 9s.

Curtis's British Entomology. Illustrations
and Descriptions of the Genera of Insects found in
Great Britain and Ireland, containing Coloured
Figures, from Nature, of the most rare and beautiful
Species, and in many instances, upon the plants on
which they are found. Eight Vols., Royal 8vo,
770 Coloured Plates, £24.

Harvesting Ants and Trap-door Spiders;
Notes and Observations on their Habits and
Dwellings. By J. T. MOGGIDGE, F.L.S. With
SUPPLEMENT, 17s. The Supplement separately,
cloth, 7s. 6d.

Elements of Conchology; an Introduction
to the Natural History of Shells, and of the Animals
which form them. By LOVELL REEVE, F.L.S.
Royal 8vo, Two Vols., 62 Coloured Plates, £2 16s.

Conchologia Iconica; or, Figures and
Descriptions of the Shells of Mollusks, with
remarks on their Affinities, Synonymy, and Geo-
graphical Distribution. By LOVELL REEVE, F.L.S.,
and G. B. SOWERBY, F.L.S., complete in Twenty
Vols., 4to, with 2727 Coloured Plates, half-calf, £178.

A detailed list of Monographs and Volumes may
be had.

Conchologia Indica. Illustrations of the
Land and Freshwater Shells of British India. By
S. HANLEY and W. THEOBALD. 160 Coloured Plates,
£8 5s.

The Edible Mollusca of Great Britain and
Ireland; with the Modes of Cooking them. By
M. S. LOVELL. Crown 8vo, with 12 Coloured Plates.
New Edition, 9s.

British Zoophytes; an Introduction to the
Hydroida, *Actinozoa*, and *Polyzoa* found in Great
Britain, Ireland, and the Channel Islands. By
ARTHUR S. PENNINGTON, F.L.S. Crown 8vo, 24
Plates, 9s.

Handbook of the Freshwater Fishes of
India; giving the Characteristic Peculiarities of all
the Species at present known, and intended as a
guide to Students and District Officers. By Capt. R.
BEAVAN, F.R.G.S. Demy 8vo, 12 Plates, 10s. 6d.

LOVELL REEVE & CO., LTD., 6, HENRIETTA STREET, COVENT GARDEN.